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DEATH OF OLIVER G. STEELE, OF BUFFALO, N. Y.

Another of the Pioneers in the manufacture of illuminating gas has passed away leaving behind him a bright and shining name, a memory that may well be cherished by all, and an example that is fit to be followed by men in every walk of life. His loss will be most severely felt by those more immediately associated with him in business, in good works, and in both the public and the private relations of life which existed to so wide an extent in the locality where he dwelt.

So far as the gas interest is concerned Mr. Steele was widely and most favorably known by almost every one connected with it. Looked up to and respected by all, there are none who will not feel that a strong man has gone from amongst us. Strong because he was honest, true, and faithful; strong because he was ever kindly disposed to every one whose effort was to do right; strong because he was uncompromising in his condemnation of everything that was mean, wrong or dishonest.

Born in 1804, at New Haven, Conn., at the age of 15 he came to New York, where he served an apprenticeship at the bookbinder's trade, and afterwards completed his education at Norwalk, Conn. In 1827 he settled in Buffalo, where he became a successful business man, and identified himself with the public interests of the place, serving in many public capacities. In the year 1847 the city of Buffalo was lighted with about 60 oil lamps. Then as now many and bitter complaints were uttered against the street lighting. Mr. E. G. Spaulding, the present President of the gas company, was mayor, and Mr. Steele, as one of the aldermen, was chairman of the committee on lamps. They resolved to form a gas company, but there was no law under which they could organize. During that winter Mr. Steele went to Albany, and presented to the Legislature a draft of a general law under which companies might organize for the purpose of making and selling gas. The bill was passed substantially as Mr. Steele had drawn it, and remains to-day as the law under which the gas companies of this State are organized. He returned to Buffalo and organized the first company under the general law, and was elected secretary of the company, which position he has held ever since. Work was pushed vigorously, and in November, 1848, the oil lamps were replaced by gas, and private consumers were able to enjoy the luxury of gas light.

Thus for thirty-one years has Mr. Steele been identified with the gas interests of the country. Few managers can date their beginning of service so far back as this. Whatever Mr. Steele undertook was very apt to be successful, and his gas management was no exception; and, in his declining years, he had the satisfaction of seeing his company one of the strongest in the land. The American Gas Light Association has lost one of its oldest and best members. His absence will be felt, for his genial good nature, his sound common sense, and his clear, practical expression of just what he honestly thought, ever made his presence a pleasure and a tower of strength.

In all the walks of life he seems to have been beloved. His noblest monument will be his good works and the memory of his integrity. The Buffalo *Commercial* thus speaks of him, and no words of ours could more fittingly express the esteem in which we believe he was held by all who knew him:

OLIVER G. STEELE.

"In the death of Oliver G. Steele this young, vigorous, thriving city loses one of the liberal and public-spirited men who laid the foundation of its prosperity. All men will speak kindly of Mr. Steele to-day, and sincere tributes of respect and affection will flow in from all sides, because from the beginning to the end of the half-century that he spent in Buffalo his life has been a public benefit. This is high praise. Happy, indeed, is the man of whom it can be truthfully said, when his end has come, that his life has been a blessing to the people among whom he lived.

"The best eulogy that can be pronounced on a man like Mr. Steele is the simple record of his good works, and these are set forth elsewhere at some length. It will be well for this community if we have growing up among us those who are able and worthy to fill the places of some of the generous and public spirited old men who are rapidly passing away. There doubtless are such; it would be sad to think otherwise; but the citizens who hope to deserve equally with Oliver G. Steele the good opinion of the people of Buffalo, must set their standard of public usefulness very high, and live up to it very zealously."

Mr. Steele was buried on Friday, the 14th ult., mourned most sincerely by all who knew him. His remains were borne to their last resting place by the hands of men from the works of his company, and the tribute of respect was universal. The eloquent sermon delivered on the occasion told but a part of the story of his life. The unwritten history of such men is to be found only on the hearts of those they have left behind.

THE CITY OF ST. LOUIS vs. THE ST. LOUIS GAS LIGHT COMPANY.

A most important suit, where the very existence of a large gas company was involved, has just been decided by the Supreme Court of the State of Missouri, on appeal, in favor of the Company. It is refreshing to find that a gas company has some rights that the courts insist upon being respected. This has been one of the hardest fought battles that has occupied the attention of courts in this country. On one side, as plaintiff, was the great city of St. Louis, aided by the ablest legal talent; on the other, was the old St. Louis Gas Company, whose cause was argued and defended by equally brilliant lawyers. The suit has been going on, in one form or another, since 1876, and grew out of a provision in the company's charter that, at a certain time, the city might, if it saw fit, by pursuing a certain course as to valuation, etc., by arbitration, purchase the property and business of the company.

The two lower courts decided in favor of the city, and on June 5th, 1875, the Circuit Court appointed a Receiver for the property, ordered a valuation of the works, etc-, and since that time the company's affairs have been managed by the Receiver. Of course, no dividends have been paid the stockholders, and the profits of the business have been accumulating in the Receiver's hands, pending the decision on the appeal which was taken by the company to the Supreme Court of the State. This decision reverses the decision of the court below, and directs that court to issue an order requiring the Receiver appointed by its decree to RESTORE THE GAS WORKS to the company together with all property received by him, and all profits derived therefrom.

Doubtless, those of the stockholders who have held on to their stock have had good cause for thanksgiving, although there has been many a dark day for them during the past five years.

It is impossible, in the limits of this article, to give the various points in the case; but we commence to-day to publish the opinion of the Court in full. The main points are that, by articles of incorporation, the city should have the right to purchase, upon certain conditions, after twenty years from January 1st, 1840. If it did not purchase then, it might, upon other conditions, purchase at the end of twenty-five years from January 1st, 1840. The charter extended for twenty-five years (with exclusive right to furnish gas), and if the city refused to buy at the end of twenty or twenty-five years, then the charter was to continue twenty-five years longer. Subsequently, on January 9th, 1846, a contract was made with the city by which the latter relinquished the right to buy the works in 1860, provided that, in case it did not purchase at the end of twenty-five years (1865) it should have the right to purchase at the end of every period of five years thereafter upon the conditions named in the charter.

In the early part of 1869, the City Council concluded to buy the works and appointed arbitrators to value the works, etc.; but the gas company refused to appoint arbitrators on their part, and so the valuation, as contemplated, was not made, the company claiming that the clause of the contract giving the city the right to purchase after January 1st, 1870, was not valid. A new company was chartered by the Legislature, known as the Laclede Company. This charter was extended in 1868, but practically laid dormant until 1872, when the construction of works was commenced. A controversy ensued between the two companies, and, as usual in such cases, division of territory was proposed; and, in order to make the matter reasonably safe and sure for the new company, a tripartite agreement was entered into in 1873 by the two companies and the city, by which the Laclede Company was guaranteed the district north of Market street, and the old company relinquished its exclusive right to sell gas in that part of the city, and also sold to them (the Laclede company) the pipes, etc., therein laid. The design in having the city a party to this contract was to secure to the Laclede Company, in its district, whatever rights it might subsequently be decided that the city had from its contract in 1846 to the pipes, etc., therein, and the Laclede Company purchased the pipes, etc., from the old company. The lower courts held that the contract of January 9th, 1846, was valid. The Supreme Court decide this to be an error; also, it held that the lower court erred in holding that said contract could be specifically enforced, and also, in divesting the company, by its decree, of all title to the property in dispute, and vesting the same in the city. The lower court held that the tripartite agreement was invalid, being without consideration, and that neither the city or the St. Louis Company had any authority for making the contract.

The Supreme Court decide this to be an error, as the surrender of its right to make and sell gas in a large part of the city by the St. Louis Company was a sufficient consideration, and that, under the 13th Section of the Act of 1839, there was ample authority for making the contract. The following extract, from the St. Louis *Globe-Democrat*, is a statement of the financial status of the St. Louis Gas Company as shown by the Receiver:

"The capital stock of the St. Louis Gas Light Company is $600,000, divided into 12,000 shares of $50 each. The stock has paid as high as 28 per cent. dividend, but this was extraordinary. A number of dividends have run above 20 per cent. Before the litigation with the city began the stock was worth in the neighborhood of $200 a share, and has sold as low as $60. Of late it has ranged close upon $100. Yesterday morning, before the news came of the Supreme Court decision. the stock was quoted at $98. Immediately afterwards there was none for sale, and prices offered rose even as high as $350. Since June 5th, 1876, the city has had possession of the works, and receipts and profits have been accumulating. As soon as the gas company get possession of their works and these accumulated profits a dividend of something like 160 per cent. can be paid. The management of the Receiver, Socrates Newman, has been a very prosperous one. He has now in his possession $900,000 of Government 4-per-cents, and about $70,000 of cash. In addition to this the city owes the gas company something like $800,000 for city gas. Prior to June 5th, 1876, the city owed the company $545,670 48. The aforesaid value of the works January 1, 1870, was $1,681,-002 68 for everything south of Washington avenue.

The expense to the city of the whole suit will be very heavy. The Court costs will approximate $30,000. In addition there are enormous fees to be paid, the Receiver's salary, and other items.

[From the St. Louis *Globe-Democrat*.]

TEXT OF THE SUPREME COURT OPINION IN FULL.

"This suit was instituted in the Circuit Court of St. Louis County on May 21, 1870. An amended and supplemental petition was filed, by leave of Court, on August 4, 1875, in which the Laclede Gas Light Company was made a party defendant, and upon this amended petition the cause was tried in the Circuit Court, which resulted in a decree for plaintiff, and from which an appeal was prosecuted to the St Louis Court of Appeals, when, upon a hearing, the decree of the Circuit Court was in all things affirmed, from which latter judgment defendant prosecutes its appeal to this Court. It is alleged in the petition that defendant was incorporated by an act of the General Assembly approved February 4, 1837, and was thereby vested with power to erect works in the city of St. Louis for supplying inflammable gas and the necessary apparatus for lighting said city and its suburbs with gas; and that said city was empowered to purchase, hold and convey any estate, real or personal, for its use; that said charter was amended by an act of the Legislature approved February 11, 1839, which was immediately thereafter accepted and ratified by the stockholders, as provided therein; that said act of incorporation was further amended by an act approved February 28, 1845. The petition further alleges that defendant duly organized under said original act and the acts amendatory thereof, and acquired certain real estate, on which it erected its works, particularly describing the real estate and other property acquired—that, by the acts incorporating the company, it is provided that if

AFTER TWENTY YEARS

from January 1, 1840, the corporation of the city of St. Louis shall resolve to purchase the gas works from the St. Louis Gas Light Company, the price shall be fixed by arbitrators, one or more to be chosen by the president and directors of the company and an equal number by the Aldermen of the city, the arbitrators to take into consideration the value of the gas works and the lands, grounds, buildings and utensils, rights and interests, and everything thereunto pertaining; and if they agree, their award shall be binding; to the amount agreed upon shall be added 7 per cent. on the valuation, which aggregate amount shall be paid by the city to the company in full consideration for the works, land, ground, buildings, utensils, rights, etc., belonging to the gas company. It also alleges that it was further provided if the city declined to purchase at the end of twenty years, then the company shall, at the end of twenty-five years from January 1st, 1840, and provided the Board of Aldermen then resolve to purchase the same, sell and convey to the city their estate interest and title to the gas works in manner above provided, except that to the valuation shall be added only 5 per cent. advance, which shall be paid in full consideration for the works; provided that the corporation of the city of St. Louis shall notify the president and directors of the company of its intention to purchase at either of the times prescribed at least six months previous to the expiration of said terms of twenty and twenty-five years respectively. Certain other provisions of the charter were set out, to wi t; that the charter should continue in force for twenty-five years from January 1, 1840, unless the company should convey to the city of St. Louis its gas works, property, etc., in which event the gas works, property, etc., should vest in the city and the charter of defendants should cease and determine; but should the city not determine to purchase at either of the times provided for, then the act of incorporation to remain in force for an additional term of twenty-five years from the last date mentioned for the sale and purchase; and further, that by the amendatory act of 1839 it was provided that the city of St. Louis and the board of directors of the gas company may contract for and make regulations relating to the lighting of the city with gas in such manner as may be agreed upon, and may make generally such contracts in relation to the business of the company as may be beneficial to them and to the public.

[To be Continued.]

Proceedings of the Seventh Annual Meeting of the American Gas Light Association.

HELD AT PHILADELPHIA, PA., OCTOBER 16, 1879.

[Continued from page 228.]

SECOND DAY—OCTOBER 16, 1879.

The Association met, pursuant to adjournment, at 10 A.M.

On motion of Mr. Neal, the reading of the minutes of the previous day's meeting was dispensed with.

The President—The first thing in order will be the report of the Executive Committee.

Mr. Denniston—I would state in behalf of the Executive Committee that heretofore it has been customary for the Executive Committee to examine all the papers proposed to be read. In this instance, however, a list of most of the papers proposed to be read has already been published by the Secretary, and therefore they did not come before the Committee. The Committee have but one recommendation to make, and that is in regard to the place of the next annual meeting. The Committee have recommended that the next annual meeting of the Association be held in the city of Chicago. There is nothing further for the Committee to act upon except a recommendation which will probably be made in regard to honorary members.

The President—The question is upon the recommendation of the Executive Committee in reference to the place for holding the next annual meeting.

The recommendation was adopted.

The President—I am heartily glad that we have decided to go to Chicago to meet our friends at the West.

The Secretary—The Executive Committee had before them the long and honorable services of General Charles Roome, and his relation to this Association, as well as his long connection with the gas business. As he has now retired from the office of President, they propose to this Association the name of General Charles Roome as an honorary member. The whole matter was fully discussed in committee, and this recommendation is the result of their deliberation.

The President—Gentlemen of the Association will understand that there was not the slightest desire to retire General Roome. I am sure I but echo the sentiments of every gentlemen present when I say that it was our earnest wish to retain his services, if possible, for a longer period; but he is now somewhat advanced in life, and has been for a long time under the strain of the work he has been engaged in. It is not the slightest disrespect to say of him that he begins to feel somewhat older than he once did, and wishes to withdraw from active service in this Association. He has expressed a strong desire to withdraw from the office of President, and it seems to me but a fitting tribute to the long and eminent services he has rendered to confer upon him the title of honorary member. It is not understood, of course, that the conferring of such an honor, as it is intended to be, upon him, retires him from being an active member; but it adds to the dignity and importance of the position which he has so long occupied toward the Association. When this title is conferred, he will be both an active and honorary member.

Mr. Neal—The unanimous opinion of the Executive Committee was that an honorary member could vote. Of course, he can take part in the discussions. Another point is that he is relieved from the payment of the annual assessments. Of course, an honorary member is not supposed to be called upon to pay annual dues. The conferring of the title is complimentary. If he is an active member, of course he has both the right to vote and take part in the discussions, and he is also called upon to pay his annual dues. But if he is an honorary member, I think he is also entitled to vote and take part in the proceedings of the meeting the same as if he were an active member, although he is not called upon to pay annual dues.

On motion, the Secretary was authorized to cast the ballot of the Association for the election of General Roome as an honorary member. Major Dresser was appointed teller, and announced the unanimous election of General Roome as an honorary member of the Association.

The President—I think it would be proper to authorize or request the Secretary, or some other officer of the Association, to notify General Roome of his election.

Mr. Neal—That is the duty of the Secretary, without notice.

The President—Perhaps it would make the matter more emphatic if the Secretary were directed by the Association in this instance to notify General Roome of his election as an honorary member of this Association.

Mr. Neal—Then I move that the Secretary be authorized to send a notification to General Roome of his election as an honorary member of this Association.

Carried.

The Secretary—I have an application for active membership which I wish to present. It is the name of George G. Ramsdale, superintendent of the Citizens' Gas Light Company of Vincennes, Ind.; introduced by Mr. W. H. White and Mr. M. N. Diall.

Mr. Neal—The Executive Committee have been consulted in regard to this matter somewhat informally, and they recommend the election of Mr. Ramsdale as an active member of this Association.

On motion, the Secretary was authorized to cast a ballot in behalf of the Association for the election of Mr. Ramsdale.

Mr. Ramsdale was declared to be unanimously elected as an active member of the Association.

Mr. Denniston—It has been suggested that the Executive Committee should call attention to the fact that at the last annual meeting a recommendation was made that the surplus funds in the Treasury after each annual session should be safely invested by the Treasurer, with the approval of the Finance Committee. As there was some considerable amount of money expected to be held by the Treasurer at the last meeting, this resolution was passed after considerable discussion in an amended form. After the cost of printing had been deducted, however, there will be in the hands of the Treasurer a considerable sum of money; and I desire to call the attention of the Association to the fact that there was such a resolution introduced, and that it was finally adopted in the form as shown upon page 152 of the printed proceedings.

The President, in winding up the discussion said: "The question now recurs upon the original recommendation of the Committee that the surplus funds be safely invested by the Treasurer, with the approval of the Finance Committee."

This was carried.

The President—It will now be necessary for the President or Secretary to notify the Finance Committee of this action, so that the matter may be attended to at the close of this meeting, in order that the funds now in the hands of the Treasurer may be invested as the Finance Committee may direct. I will say that this matter was talked over in the Committee this morning, and several suggestions were made as to investing the surplus funds in bonds, etc., and it was finally determined to leave the matter as it is, and call the attention of the Association to it, so that if it is thought necessary there may be further action taken in the matter.

Mr. Helme—As I understand it, there was some $1,200 expected to be held over in the hands of the Secretary and Treasurer at the time that resolution was passed, but after the printing was done, which amounted to something over $700, there was but a small amount left. After the bills for printing and the miscellaneous expenses were taken out there was such a small surplus, as I understand it, remaining in the hands of the Secretary and Treasurer, that no investment was considered necessary, but the balance was carried over until this year, when it will be invested in the manner that may be finally determined upon. I make this statement as simply explanatory to the Association of the reason why there was no investment made last year, according to the resolution; but the money will be invested after this meeting, under the supervision of the Finance Committee and the Treasurer.

Mr. Harbison—As the Chairman of the Finance Committee is not present, and being the second member, perhaps it would be well for me to explain to the Association why the Finance Committee did not carry out the instructions embodied in the resolution passed last year. The matter was discussed by the members of the Committee, the Treasurer being absent at the time and all the members of the Finance Committee being present; and it was there unanimously voted that the surplus funds, amounting to some $600 after the estimated bills for printing were deducted, be invested in Government bonds drawing 4 or 4½ per cent. interest, and that the chairman of the Finance Committee, with the Treasurer, be directed to purchase these bonds and hire a box in a safe deposit company's vault in New York city in which to place them, in the name of the Association. The bonds were not to be withdrawn from their place of deposit without the presence of the Treasurer and a member of the Finance Committee. At least two persons were directed to be present in order to withdraw the bonds from the place of deposit. The Finance Committee adjourned, expecting that that action would be carried into effect by the Treasurer and the chairman of the Finance Committee. It was found afterward that when the books ordered by the Association were published, there would not be much money left to invest; therefore the resolution of the Finance Committee was not carried into effect. Owing to the illness of the Treasurer during the summer, as he has already stated to the Association, the books were not published until this time. They have not yet been paid for. I am speaking now of the close of the fiscal year of the Association—September 30. As was reported, there is about $1,100 in the Treasury. The bill for the publication of this book, amounting to something like $700, must be paid, however, which will leave about $400, as was stated, in addition to the annual dues now coming in, which would leave in the hands of the Treasurer something like

$1,000 or $1,200. As there have been no extraordinary expenses this year, there is no reason to suppose that there will not be between $1,000 and $1,100 left over in the hands of the Treasurer, to be invested as was ordered by the Association last year. I have simply made this statement in order to explain to the Association the reason why the directions embodied in the resolution to which reference has been made, as well as the action of the Finance Committee subsequent thereto, were not carried into effect.

Mr. C. A. White—I do not think that there is any necessity for action in this matter at all. I think the thing is in as good shape now as it can be. It seems to me that some other form of investment might be found quite as sensible and profitable as investing these surplus funds in government bonds and hiring a box in a safe deposit company, paying more for the rent of that box than the interest on the amount of money invested. I think the matter may be safely left as it is.

The President—The resolution adopted last year contemplates some permanent arrangement in reference to the care of these funds under the direction of the Treasurer and Finance Committee.

Mr. Harbison—The resolution did not instruct the Finance Committee to invest the funds in the way I have suggested, and to hire a box in which to deposit the bonds. It was understood by the Committee that a box could be hired for $10 a year in the vaults of a safe deposit company in which to place this little investment. I think the Finance Committee are abundantly able to direct and decide as to how this money shall be invested. I am merely calling the attention of the Association to what has been done before, and explaining why the resolution has not been carried into effect.

Capt. White—If there is no further business before the Association at the present time, and if I am in order, I would make a motion that a committee be appointed to prepare resolutions expressing the regret of this Association upon the death of members during the past year. The membership of the Association has become so extended that every year brings the sad record of the departure from this life of some of our members; and it is but just to ourselves that we place upon our minutes some record of our recognition of the merits of these gentlemen during their lifes, and our condolence with their families at their death. I therefore move you, sir, that a committee of three be appointed by the Chair to draft resolutions upon this suject.

Carried.

The Chair then appointad Capt. White, Major Dresser, and Mr. Nettleton as the committee.

The Secretary—I understand Capt. White has a paper which he wishes to read before the Association.

Capt. White—Mr. President, you appointed a committee yesterday, consisting of Major Dresser and myself, to telegraph to General Hickenlooper the congratulations of this Association upon his election as Lieutenant-Governor of the State of Ohio; and that committee now desire to report that they did telegraph to General Hickenlooper yesterday morning, and they heard from the General this morning. The committee do not mean to intimate that the General has been in a condition not to reply to the telegram earlier; but it would seem that the joy he felt upon his election has been such that he was not able to reply earlier. Possibly some of the Gold Seal which he so bountifully opened for us when we were at Cincinnati has been opened by his friends for his entertainment. The committee telegraphed to him as follows:

"The American Gas Light Association, in session at Philadelphia, desires to know if the citizens of Ohio have sufficient confidence in a gas-man to elect him as their Lieutenant-Governor. If so, we congratulate the citizens. Answer, for 'we in anxious expectation sit.'" Signed by the committee.

General Hickenlooper replied to this effect:

"Say to the American Gas Light Association that among her other memorable acts Ohio has chosen a gas-man for Lieutenant-Governor by 17,000 majority. (Signed) A. HICKENLOOPER."

[Laughter and applause.]

The President—The reading of papers is now in order. The Secretary suggests that the first paper had better be one prepared by Mr. Charles H. Nettleton.

The paper was then read by Mr. C. H. Nettleton, as follows:

SUPPLYING GAS WITHOUT A HOLDER.

Early in June last I had the exceptional experience of supplying gas without a holder, and thinking the details of the work might possbly be of some use and interest to the members of this Association, I have jotted down a few notes relating to it, and trust I shall present them in intelligible if not in elegant English.

The circumstances and causes which led me to supply gas without a holder were as follows: The company I am connected with has but one holder, of a capacity of 50,000 feet. Owing to defective fastenings, the larger part of the wall plates against which the bottom rollers ran had fallen to the bottom of the tank, and as that gave the holder a great deal of play, it rose and fell very unevenly. It was invariably at least one foot higher on one side than the other, and sometimes two or three feet. Often the crown pulley got off the guide rails, and occasionally it freed itself entirely, and fell over on its side. I was fearful that any day it might be so disabled that it would be impossible to use it.

This state of affairs had reached such a pass last winter that, although sending out over 40,000 feet, I did not dare raise it but half way up. As the consumption was rapidly increasing, it was evident that by some means the holder capacity must be enlarged. The directors voted to build a new holder; but that meant a debt, and consequently I disliked exceedingly to adopt that plan. I knew that a city in Massachusetts had been supplied without a holder, and after paying a visit to that place, and interviewing the manager, from whom I received a great deal of encouragement to repair the holder, I resolved to make the experiment of supplying gas without it.

As a preparatory measure, a circular was sent to all the consumers, stating the fact that certain repairs were necessary, and requesting all to use as little gas as possible, and preparing their minds for a possible failure in the supply. It may be interesting to note here that for the eight days the holder was out of use, more gas was sent out than either before or after. A portion of the increase was probably due to increase in pressure on the mains; but I doubt that any of the consumers, except personal friends of my own, paid any attention to the request.

The inlet and outlet of the holder were connected by a four-inch pipe, the drips filled, and in that way the gas passed directly from the station meter to the mains.

In the ordinary supply but one bench of five retorts is used. A second was fired up. These were each composed of four retorts, 12x22 inches, and one 15x30, all 9 feet long—giving in all 177 feet of retort floor.

In order to economize time, it was arranged to pump out the tank in the night. The holder was grounded at ten o'clock, and of course, at the same moment, gas was supplied direct from the retorts. For a short time more gas was sent out than was needed, and in consequence the pressure ran up from 1.6 to 3.0; but by slacking lids this was soon reduced. The next day and during the following days it was quite easy to keep the pressure nearly uniform, by charging retorts often with 50-pound charges. The day man had instructions to watch the pressure gauge carefully, and when the pressure had fallen to 0.9 to put in a charge. This would cause it to run up to 1.4, and then, in about half an hour, the operation would be repeated. In this way an average of 4,460 feet was sent out each day, between seven o'clock in the morning and six in the evening.

For the night work, the following routine was generally observed, and as it worked well, I give it in full. It was singular to notice that night after night a certain number of retorts were needed by a certain time, the variation being scarcely more than two minutes.

By half-past six all retorts were empty except one, and that contained a fresh charge of 150 pounds, with pressure at 1.4. All lids were ready luted, coal in wagons, and everything in readiness to charge when gas was needed. By seven o'clock the pressure would drop to 1.2, and a charge of 300 pounds was put in. It would then run up to 2.2. By twenty-five minutes past seven it would fall to 1.6, when another retort would be charged, and the pressure would increase to 1.8. After ten minutes, the pressure would commence again to drop, and on the slightest indication of this a third retort was charged. From this time on it was generally necessary to charge the remaining retorts as fast as two men could do the work. Once, and once only, the pressure dropped to 1.4, and remained so for an hour; but otherwise it was maintained steadily during the hours of a large consumption at from 1.6 to 1.8. After ten o'clock the pressure would increase so that the lids of one or more retors were slacked. At twelve, some fresh charges were needed; but the consumption was so slight that 100 to 150 pound charges were sufficient, and at daylight this was reduced to 50 pounds. The average daily consumption was 18,100 feet, Sundays excepted.

In only one thing have I any cause for regret. The coal used during the daytime was so slight in quantity, and the heats so high, that the mains became filled with exceedingly poor gas, and this had to be consumed in the early part of the evening, before the fresh and rich gas reached the burners. As all of my time was spent at the works, I did not know how poor it was until one of the consumers spoke to me about it. If that had been avoided, either by the use of cannel or slacking the lids of the retorts before all of the gas had been extracted, the work would have been done to my full satisfaction.

Before starting with this work, it was suggested to me that there would be considerable oscillation in the pressure, caused by the revolutions of the exhauster fans, and that the supply would for that reason be unsatisfactory. Such was not the case, however, as the oscillations in the pressure were generally half a tenth, and never greater than two tenths. It was so slight

that I could not detect in in an ordinary burner. From the experience in the city in Massachusetts to which I have referred, and my own, I conclude that for this work one foot of retort floor is needed for every 100 feet consumed in 24 hours.

I trust you will pardon me if I have gone too much into detail. I should not have done so but that I knew of no other way to make a paper on this subject of any value. In it I do not claim any credit for originality, as the same thing has been done at least once before in this country; and, further, I should not have written this paper at all but that I wished to place on record the fact that gas can be supplied without a holder.

The Secretary—Mr. Coggshall, of Fitchburg, Mass., I believe, was the first one who attempted to supply gas direct from the retorts. Mr. Coggshall is present, and perhaps he will give us the result of his experience.

Mr. Coggshall—My experience was so similar to that detailed by Mr. C. H. Nettleton in his paper that it is hardly necessary for me to go over it. I had substantially the same experience that he had.

Mr. Floyd—I would state that some nine years ago, about Christmas time, I lighted Blackwells Island for a week without any holder.

A Member—I understand that Mr. Cartwright had some experience of that kind some years ago.

Mr. Cartwright—My experience was not exactly furnishing gas without a holder. It was necessary that I should keep up the supply of gas to our consumers. I constructed a temporary holder of frame-work, and floated it in the river. Its capacity was about 6,600 feet. We were then sending out about twenty. I did not send it out entirely without a holder. The holder was made of 3x4 scantling, and the sides were covered with ordinary inch pine boards—covered with tin to make it tight.

The President—You did not attempt to supply gas without a holder, but you made a temporary holder.

Mr. Cartwright—Yes; I constructed a temporary reservoir, and floated it in the river, and by that means I kept the supply going.

Mr. Harbison—I would like to inquire what yield Mr. Nettleton got from his coal at the time he was supplying gas without a holder; and also whether he found that financially it would be profitable to run gas works without a holder.

Mr. Nettleton—The yield was about four feet. It was not profitable to run without a holder. I would not advise the stockholders of gas companies to run their works without a holder. It was a matter of economy with us; we could not afford to build another holder, and we got along very successfully—at least, I think we did. Of course, during that week my expenses for coal were more than they ordinarily are.

The President—No one will understand Mr. Nettleton as advocating a system of that kind. He does not recommend the resort generally, and a system of supplying gas without a holder, I apprehend, would not work.

Mr. Harbison—I did not mean to intimate that he did so. But I simply wanted to get his views upon the matter. We had a similar experience to that in our works. About 15 years ago our holder was not of sufficient capacity to furnish all the gas demanded, and for a time we supplied the gas from the mains. We increased our supply in that way. In addition to the capacity of our holder, we sent out enough from the main to supply the demand.

Mr. McIlhenny—Every manager of a gas company should be a man of expedients. Mr. Nettleton shows that he was the man for an emergency of that kind. He adopted this peculiar process in a case of necessity. I can see no difficulty in supplying a small town without a holder, provided your manufacturing capacity is equal to your maximum consumption. If the manufacturing capacity is less than the maximum consumption, then it would be impossible. It would be impossible to supply a large city without a holder, because you cannot get a supply sufficient to do it properly. I do not think there is much difficulty in a small town, where you can manufacture just such an amount as you require. But where your manufacturing capacity is less than the maximum consumption, it will be impossible.

Mr. Cartwright—I would inquire of Mr. Nettleton if he had very many complaints among his consumers during the time he was furnishing gas in that way?

Mr. Nettleton—Perhaps I did not explain that point to the Association as I should have done. There was a constant variation in the pressure of about one-half a tenth. Sometimes the gauge would jump up to two-tenths; but the average was about one-half a tenth. I had some complaints from my consumers about the quality of the gas, some of them saying that it would scarcely light. This was caused by the mains being filled with poor gas, and when it was first turned on the quality of the gas was certainly anything but good. But, of course, when the fresh gas came along it was of the ordinary quality. This could have been avoided by putting in cannel, or by not getting all the gas out of the coal. If I were to go over the same thing again, I could do better.

Mr. Neal—I confess to a feeling of disappointment since hearing the conclusions arrived at by Mr. Nettleton after trying these experiments. Of course, you can easily reduce the cost of manufacture, but it is not so easy to bring down the cost of distribution. When I heard that such a paper was to be read, I had great hopes that Mr. Nettleton was going to bring forward something to show how the cost of distribution could be reduced very materially; but I find that the conclusion he has arrived at is that the cost of distribution cannot be reduced by distributing the gas without a holder.

Mr. Harbison—There was a point drawn out in the paper by Mr. Nettleton which I think the Association has not noticed. He shows quite clearly how the consumption of gas may be increased. We heard from our President yesterday his very interesting remarks about the necessity of having the moral support of the community in favor of the gas companies. I heartily agree with all he said upon that point. Mr. Nettleton had the financial support of his community during the time he was making these experiments; and he points out to us very distinctly the way in which companies may increase their consumption. All they have to do when they are laboring under a difficulty is to send out circulars to their customers, and to say that there is a possibility of a shortness of supply, and to request them to use as little gas as possible. They will at once light up every additional burner about their premises, in order to help the company out. [Laughter.]

Mr. Helme—I am little surprised at the view Mr. Neal has taken of this matter. I thought Mr. Nettleton was simply going to give us a little of his experience, in order to enable us, who sometimes get into tight places about Christmas week, to get out of them; and I think he has done it very clearly. I am sure no gentleman in the Association will understand that he suggests the idea of running gas works without a holder. Anyone knows that we make gas during 24 hours to be used up in about four; but we further know that at times (especially during Christmas week, and notably in Mr. Forstall's city) there is a very large increase in gas consumption, and it is certainly of great importance that we should know how to get out of the emergency when it presents itself. Mr. Nettleton has shown us how he tided over precisely such an emergency as we are likely to find ourselves in at certain seasons of the year. By adopting a suggestion that he has made, with holders of the capacity of 75,000 or 100,000 feet, we could send out 125,000 or 150,000 feet. In Atlanta it was done this week. We sent out 91,000 feet out of a capacity of 80,000 feet, and we expect to be called upon to do the same thing again. This paper of Mr. Nettleton's I regard as one that is exceedingly valuable to the Association, because it points out the way in which it can be done easily and without giving dissatisfaction to the consumers I found myself, after the first night or two, in something like the predicament that a gas company in this neighborhood found themselves in. They had received very nicely built works, but in the early part of the evening they found that the gas was very poor; it was a mystery to them, and the contractor could not explain it. But when somebody went there who knew something about it, they found that they were using the same pipe for an inlet and an outlet. The result was that when the consumers turned on the gas, the gas went straight from the meter into the streets, and at the beginning and end of the charge they had very poor gas. But that was corrected. Mr. Nettleton, I believe, charged the retorts separately, and kept his eye on the pressure gauge, and conducted his experiments very successfully and satisfactorily. I think his paper is full of valuable suggestions to us, who may find ourselves in an unpleasant position about Christmas week—which is very often the case.

I move that a vote of thanks of the Association be returned to Mr. Nettleton for his very excellent and practical paper (which is generally the character of the papers Mr. Nettleton favors us with) that he has just read.

Mr. Harbison—I wish to say, before the motion is put, that we had no such difficulty as he alludes to in reference to poor gas at the end of the charge. We tried these experiments one after the other; but there was no break in the quality of the gas. We charged, every hour, a quarter of the number of retorts in the house; but we had, during no particular time of the four hours, a poor quality of gas. We did not experience any difficulty of that kind at any time.

Mr. Helme—Mr. Nettleton has stated that he could now easily overcome that difficulty, since the experiments he has tried.

A vote of thanks was then tendered to Mr. Nettleton.

The President—The next paper is that of Mr. Pearson, of Toronto, on the manufacture of gas from water, under the Lowe Process, at Toronto, Canada.

The Secretary—Before Mr. Pearson commences his paper, I wish to say how it comes that he presents it to the Association at this time. Early in the summer requests were made to me as Secretary of the Association that the subject of water gas generally might be discussed at this meeting, so that it might be fully investigated by the Association, in order that the different companies might know the real merits of that process, and how far

each company might be affected by it; whether all would be affected alike, or whether it would be proper for some to adopt the new process, and some to adhere to the regular coal process. During the summer several requests came from different members, expressing the same view, and suggesting that the subject be ventilated at this meeting. I then applied to Mr. Pearson for a paper on that subject, as I thought he was favorably situated to give us some results from practical experience. Mr. Pearson at first asked to be excused, but I pressed him most earnestly that he should prepare and read a paper at this meeting, and he has consented to come here and present the paper at very considerable inconvenience to himself.

Mr. Pearson—I am very much obliged to the Secretary for his kindly introduction. I will state, before reading the paper, that I have been laboring under ill health of late, and have not been able to make my paper as satisfactory in every respect as I could wish it to be.

Mr. Pearson then read his paper on the manufacture of gas from water at Toronto, under the Lowe Process.

THE LOWE (WATER) GAS PROCESS.

At the last meeting of this Association, in reply to some statements made by a member in a paper on water gas, unfavorable to the Lowe Process, I gave an account of what I had seen of its working in several places which I had visited, and expressed my conviction that the chief cause of its failure, where it had failed, was the want of proper purification. I stated, further, that the Consumers' Gas Company of Toronto, of which I am the Secretary, had purchased the patent right for Toronto conditionally, and that the proprietors, S. A. Stevens & Co., were about erecting two sets of apparatus in the works of the Company; and I promised that if I should be present at this meeting I would give an account of its working there.

It is in fulfillment of that promise, and in compliance with the very urgent request of the Secretary of this Association, that I now, with considerable diffidence, present this paper.

As Mr. Chambers, in his paper, gave an account of the origin and progress of water gas in general, I shall confine my remarks entirely to the Lowe Process. I would, before proceeding further, state that I am not in charge of the works of the Company; they being under the superintendence of Mr. Alex. Patrick, under whose supervision the works now in progress of erection hereafter referred to are being built. I have had, however, ample opportunity to watch the working of the process in Toronto and elsewhere, and to become acquainted with its details; and can speak with full confidence as to the financial results.

As most of the members of this Association are doubtless aware, the Lowe Gas Process was invented by Mr. T. S. C. Lowe, of Norristown, Pa., and the process was patented by him in the United States in September, in 1875. It was first worked by the inventor at Phœnixville, Pa., in 1874, upon a very small scale, where the original works are still in operation, and subsequently works were erected at Conshohocken and Columbia, Pa., Dobson's Mills, Philadelphia; Trenton, N, J.; Harrisburg, Pa.; Fort Plain, Utica, and Clyde, N. Y.; Lancaster, Pa., Indianopolis, Ind.; Baltimore, Md.; Scranton and Wilkesbarre, Pa.; Newburgh, N. Y.; and Kingston, Brockville, and Toronto, Ca.

It will thus be seen that the process has made considerable headway since its introduction at Phœnixville five years and a half ago, and with the exception of Trenton and Harrisburg, where the gas was not purified, most of the above companies have, in a published statement, expressed high satisfaction with the process.

The Apparatus.

The apparatus consists of oil storing and distributing tanks, a generator, superheater, wash-box, scrubber, condenser, hydraulic main, and multitubular condenser, boiler, and blower. The oil distributing tank is placed above the working gallery, and has tubes at the bottom to convey the oil to the generator.

The "generator" is the chamber in which the gas is made. It is a cupola made of boiler plate, lined with fire blocks. It has an opening at the top with a cover, which is clamped down during the process of "blowing up" and gas making. There is a grate at the bottom, with an open space below, through which it is blown up by the air blast. A pipe is inserted a short distance above this space, through which the steam is forced during the process of gas making. A pipe from near the top of the generator conveys the gas to near the bottom of the superheater.

The "superheater," where the gas is "fixed," is also a boiler-plate cupola, lined in the same manner as the generator. It is generally from one-third to one-half higher than the generator, and one-fifth less in diameter. There is an arched air space in the bottom, the arch being perforated. Above this space, and nearly up to the gas outlet at the top, fire brick are placed in layers, with spaces of about two inches between them. It has an opening at the top communicating with the smoke-stack, which is left open during "blowing up," and closed with a valve during gas making. Another pipe from near the top of the superheater conveys the gas to the wash-box, and an air-blast pipe enters the bottom of the superheater near the pipe connectig it with the generator.

The "wash-box" is an oblong boiler-plate box, square on three sides and rounded at the bottom. A perforated boiler-plate diaphragm is placed across about one-half of the box, for the purpose of breaking up and more thoroughly washing the gas.

The wash-box is about three parts filled with water, and the gas from the superheater is conveyed by a pipe which passes through the top at the end nearest the superheater, to a sufficient depth in the water to seal the gas. The tar is run off from the bottom into a well. The gas passes from the top of the wash-box to the bottom of the scrubber.

The "scrubbers," of which there are two for each set, are a little higher than the generator, and about three-fifths of its diameter, and are also made of boiler plates. They are similar to the ordinary scrubbers of coal gas works, and need no further description.

The gas is passed from the wash-box to the bottom of the first scrubber, from the top of the first through the top of the second, then down through the hydraulic main, from thence to bottom of the multitubular, and from the top of the multitubular to the main leading to the purifiers; from thence to the meter, and thence to the holder.

The "multitubular condenser," also made of boiler plate, is only used when the works consist of two or more sets of apparatus, and is generally placed in the centre of the scrubbers. Being similar to those used in coal gas works, it need not be described.

Mode of Working the Process.

The valve from the superheater to the smoke-stack being open and its gas outlet being closed, the generator is kindled through the door at its base, charged with anthracite of large egg size through the top, and then closed and fired up by an air-blast entering below the grate. The gases formed by combustion in the generator, viz., nitrogen and carbonic acid, are driven out of it through the pipe to the chamber at the base of the superheater, where, meeting an air-blast, they ignite and flame up through the loose mass of fire brick, evolving so intense a heat that, by the time the coal reaches a cherry red, this will stand at a white heat. This is the proper condition for gas making.

The air-blast is then shut off, the valve at the top of the superheater is closed, and at the same time steam (preferably superheated) is admitted a little below the grate bars of the generator, and, by contact with the incandescent fuel, is decomposed, forming hydrogen and carbonic oxide.

Simultaneously small streams of crude petroleum are dropped through the ascending gases directly upon the red-hot coal. The hydrocarbons thus released pass, together with the water gas, to the bottom of the superheater, rushing upward among the white-hot bricks therein to the outlet, by means of which they escape to the washer.

Of course, the continuous passage of steam through the coal gradually reduces it heat, and when this falls below a certain point the gas making is stopped, a small quantity of coal is thrown into the generator, and the blast is applied again until the heat is sufficiently restored.

When the amount of gas required is considerable, two or more sets of apparatus are employed and used alternately—that is, one is running gas, while the other apparatus is re-firing, thus securing a cantinuous production of gas.

It will thus be seen that the distinctive feature of the Lowe Process is the introduction of petroleum or other hydrocarbons to the incandescent coal in the production of the divers gases simultaneously in the same chamber, and this is claimed to be one of its chief advantages, inasmuch as it prevents that waste of heat which takes place when it is applied externially, as in other gas processes.

Introduction of the Process at Toronto.

As I gave an account of the introduction of the process at Toronto at the last meeting of this Association, it will not be necessary for me to go over the same ground again. Two sets of apparatus, of sufficient capacity to produce 150,000 cubic feet per diem were at that time in process of construction for the proprietors of the patent by Messrs. Ridout, Aird & Co. They were not completed, however, until February last.

Gas was first made on February 9, and on March 1 the works went into full operation; and up to September 30 last 26,641,000 cubic feet of gas had been produced.

Results Obtained.

In the following table I have not considered it necessary to give the prices of materials and expense of labor, as these vary in different places, and it could be of no practical benefit. Each one can make up the cost for himself at the prices prevailing at the place where his works are located.

Average Results for Seven Months.

Year 1879.	Average Production per Diem, when Works were Running Full Time.	Average Number of Charges per Diem.	Average Production per Charge.	Average Materials Used per M feet, whole time working.			Gas Purified per Bushel Lime.	No. Men Employed in 24 Hours.
				Crude Petroleum.	Anthracite Coal in Generator.	Coke for Boiler.		
	Cubic Feet.		Cubic Ft.	Gallons.	Pounds.	Bush.	Cubic Ft.	
March	153,000	38	4037	4.46	54.91	.18	16,610	‡7
April	166,000	41	4066	4.11	53.17	.11	8,910	7
May	155,000	39	3604	4.18	52.48	.18	11,630	7
*June	129,000	34	3794	4.09	62.46	.22	11,050	7
*July	107,000	33	3242	4.14	68.91	†.36	9.700	7
August	162,000	35	4674	4.08	58.91	.38	13,960	7
September	163,000	36	4527	4.04	59.09	.38	13,160	7
Average for 7 months.	148,000	36.56	3992	4.15	58.56	.26	10,717	7

On eleven occasions 190,000 feet and upward per day were made, and on one occasion 210,000 feet.

* During these months a number of samples of coal were tested, some of which were very inferior. There was also a partial stoppage in the supply through the fusion of the bricks and deposition of carbon immediately over the arches in the superheaters.

† Discontinued burning tar after four months.

‡ Comprising 1 engineer, 1 oil-man for gallery, 1 stoker for ground floor, and 1 laborer in the daytime. The same force at night, with the exception of the laborer.

Until February all the gas made was from coal, about 8 per cent. of cannel being used. In February only about 6 per cent. of Lowe gas was made. After April 4 no cannel was used except on Sundays, when no Lowe gas was made. After February the following quantities were made:

March,	Lowe gas,	3,837 M;	coal gas,	8,250 M;	total gas made,		12,087 M
April,	"	4,493 M;	"	5,367 M;	"	"	9,860 M
May,	"	4,188 M;	"	4,076 M;	"	"	8,264 M
June,	"	3,096 M;	"	3,809 M;	"	"	6,905 M

It will thus be seen* that in the months during which the largest proportion of Lowe gas was made the quantity of sulphur found was very much less than average, the ammonia considerably less, and that no sulphuretted hydrogen was detected; while the average illuminating power during the time when Lowe gas was made, when no cannel was used, was equal to that of the coal gas enriched by cannel. As the average candle power from April to June was 15.15 (the candle power of the coal gas, without cannel, being under 14 candles), and as less than half of the gas made was Lowe gas, it is fair to assume that the illuminating power of the Lowe gas was over 16 candles. Tests of this gas taken separately by a Sugg's illuminating power meter showed between 16 and 17 candles, and daily tests taken by the same apparatus of the mixed gases averaged from 15½ to 16 candles. It has also been demonstrated that the illuminating power of the gas can be kept at nearly the same figure. The photometer used by the Government is a Bunsen's bar photometer.

General Remarks.

No difficulty of any importance was experienced until the works had been in operation over three months, when a gradually diminishing yield gave warning that something was wrong, and a careful examination resulted in the discovery that the loose bricks in the superheaters immediately over the arch had fused together to such an extent as to stop the free flow of the gas. Two or three days, however, were sufficient to remove and replace them, and one day would have been enough, were it not necessary to wait until the superheaters cooled.

As the quantity of bricks destroyed was only about 200, the expenditure was not great.

This difficulty was unexpected, as we had not then heard of its having taken place elsewhere; but we have learned since that similar trouble has arisen in other works, and we think it will be necessary to have the superheaters examined every three or four months.

In our opinion a larger amount of purification is required than for coal gas; the cost per thousand, including labor, with lime at 22 cents per bushel, amounts to about 3⅓ cents per thousand; and, owing to the great rapidity with which gas is made, larger purifiers are required than would be needed in coal gas works, where the same quantity of gas is produced per diem. It has also been found necessary to use lime exclusively for purification.

Men of greater intelligence are needed than answer for stokers in coal gas works—more care, watchfulness, and judgment being required.

Owing to the character of the petroleum used, it is found necessary to steam out the wash-boxes for about half an hour each day; but as this is done while the fires are being raked down, no time is lost. Where naphtha is used it is not necessary to do this. It is also desirable to steam out the scrubbers two or three times a week for a few minutes.

We have had but one stoppage in the pipes in the works after purification of the gas, and that was in the pipe between the purifiers and the station meter, which was partially clogged with naphthaline, but not to a greater extent than has been the case with our coal gas.

There have been no stoppages in the mains outside of the works. A few service pipes have been partially obstructed with naphthaline, but not more than in former years. We have had no complaints of the stopoages of burners.

A large quantity of tar is made, and we are now having an analysis made for the purpose of ascertaining its value.

The advantages of the process as compared with coal gas manufacture may be summed up as follows:

1. The great saving in the cost of labor. In works where two sets of apparatus are used, 7 men can produce an average of 150,000 feet per diem, and in large works the same number of men can work three sets, and produce 225,000 feet per diem. In Baltimore they claim that 12 men can work eight sets—that is, 6 men in the day and 6 in the night.

2. The small amount of wear and tear as compared with the retort system.

3. The comparatively small amount of storage room required where all the coal needed for the year has to be laid in in the summer. One ton of coal being sufficient to make 34,000 feet of gas, not much more than one-quarter of the room is needed.

4. The saving in interest in not having to purchase so much material in advance—the petroleum being obtainable as wanted.

**Return of the Illuminating Power and Purity of the Gas of Toronto for the Year ending June* 30, 1879.—Made by the Government Inspector.

1878–79.	Illuminating Power.					Sulphur per 100 Cubic Feet.					Ammonia per 100 Feet.					Sulphuretted Hydrogen—Time Present.
	Highest Candles.	Lowest Candles.	Average Candles.	Stand'rd Candles	Number Tests.	Highest Grains.	Lowest Grains.	Average Grains.	Stand'rd Grains.	Number Tests.	Highest Grains.	Lowest Grains.	Average Grains.	Stand'rd Grains.	Number Tests.	
July	15.70	15.63	15.67	12	3	14.27	10.10	11.51	20	3	5.25	2.10	3.86	2	3	0
August	16.45	14.70	15.51	12	5	17.55	15.12	16.57	20	5	3.67	2.09	3.20	2	5	0
September	16.01	14.50	15.26	12	4	15.17	11.90	13.72	20	4	3.12	2.04	2.69	2	4	0
October	15.69	14.64	14.97	12	5	15.91	11.82	13.84	20	3	4.00	1.50	2.85	2	3	0
November	15.95	14.23	15.38	12	4	20.30	9.80	14.08	20	5	17.80	6.60	10.30	2	5	3
December	16.33	15.50	15.75	12	4	15.90	11.90	13.37	20	4	5.00	2.50	4.02	2	4	2
January	15.82	14.29	14.96	12	4	11.80	8.10	10.20	20	4	2.00	1.41	1.61	2	4	3
February	15.63	13.49	14.49	12	4	12.40	8.30	10.50	20	4	0.75	0.50	0.56	2	4	1
March	16.46	14.22	15.45	12	8	14.00	9.98	12.08	20	4	1.50	0.75	1.18	2	4	3
April	16.70	14.00	15.42	12	9	9.22	6.70	7.86	20	4	2.00	1 00	1.50	2	4	0
May	15.55	14.62	14.91	12	4	9.56	8.83	9.22	20	4	2.00	1.00	1.60	2	4	0
June	15.88	14.28	15.13	12	4	11.00	9.27	9.79	20	4	3.00	0.53	1.38	2	4	0

The above returns were kindly furnished by the Acting Commissioner of Inland Revenue in advance.

5. The rapidity with which gas can be made in cases of emergency. In Toronto, as stated, 200,000 feet per diem was made, and in Baltimore I am informed that 600,000 feet have been made with eight sets of apparatus during the night.

6. The heats can be let down at any time without injury to the apparatus; consequently work can be stopped on Sundays. Gas can be made within four hours from the time the fires are lighted in the generators, and it has been done in two hours at our works.

The directors of the company were so well satisfied with the general working of the process and the results obtained that in July last they completed the purchase of the patent right for Toronto, paid the proprietors for the works they had erected and took them off their hands, and decided upon erecting five additional sets of apparatus, another purifying house, additional purifiers, and a station meter. The work is now far advanced, and the whole is expected to be completed before the close of the year. These apparatus, with the others erected, will have together a capacity of over 500,000 cubic feet per diem.

Situated as we are in Toronto, with anthracite coal a little cheaper than bituminous, and petroleum at a moderate price, we find it considerably to our advantage financially to make gas by the Lowe Process—so much so that we felt justified in reducing the net price of our gas on the 1st inst. from $2 and $1.75 to $1.75 and $1.50 per thousand feet; and unless anthracite and petroleum advance and bituminous coal declines very considerably, we shall make by far the largest proportion of our gas by the new method; and probably should make the whole, were it not that the works now nearly completed will not be of sufficient capacity to supply the rapidly increasing demand.

The reading of the paper was greeted with applause.

Mr. Helme—Mr. Pearson at our last meeting made a promise to make a report on that subject, and I rise to say that the paper he has prepared is very full and very satisfactory, and one of the most complete that has ever been before this Association. The subject has frequently come up; but it has always been disposed of in an unsatisfactory way. There is only one thing which Mr. Pearson has omitted, and I suppose that that is the fault of the government inspector; and that is that he does not say anything about carbonic oxide. That has often been a mooted question in connection with the Lowe process of making gas; and I should have been glad if Mr. Pearson had gone further, and given us some information upon that point.

Mr. Pearson—I can furnish it if required.

The Secretary—Before the discussion begins I desire to say that it was understood that probably this paper would be very much criticised, and a great many questions asked. Mr. Pearson is ready to answer any questions that may be asked so far as he can possibly do.

Major Dresser—In order to keep our record straight (which is of great importance) I would suggest that Mr. Pearson be requested to take a seat at the table here, and that each member who has anything to say upon the matter get up and say it and then sit down, and then the next man, and so on. Mr. Pearson can make his notes as to each man's objections; and then, after all the members get through, Mr. Pearson can in one address reply to each one *seriatim*.

The Secretary—As Major Dresser says, it is important to the Association to have this record perfectly clear, and perfectly distinct and accurate. In order to do that we want the name of each man who addresses the President so that the stenographer can take it down.

Mr. Littlehales—I think the most satisfactory method to pursue is for each member to ask Mr. Pearson questions, and to have each question disposed of as we go along.

Mr. Helme—I would like to ask Mr. Pearson if he has a record of the exact quantity of carbonic oxide which he gets per thousand feet of gas?

Mr. Pearson—No, sir. I would say that we have not had the gas analyzed; but before introducing it, the gas, as made at Kingston and at Brockville, was analyzed by Professor Allen, of the Toronto University; and if you desire to have that statement I can let you have it. I would say upon that point that I received a letter from a hotel keeper, in regard to a lady who had inhaled the gas, which I will read if you wish me to.

The President—I don't think we want any such trash as that.

Several Members—I would like to hear the letter read.

The President—What we want are facts; what we want is definite information. I am a little sorry that there has been so much hearsay in Mr. Pearson's article. What we wanted most of all was Mr. Pearson's personal experience—that to which he can testify and that which he knows.

Mr. Pearson—With all due deference to the Chair, I must state that I think it is my personal experience. I am personally cognizant of nearly all that I stated to this meeting.

The President—You not merely read but quoted largely from what you had been told in Baltimore. The article has the general appearance of an advocate's document. We don't want advocate's documents; we want facts. If we can learn facts from Baltimore we want them; but what we want to get at is Mr. Pearson's experience and observation. That I take to be the wish of the Association.

Mr. Pearson—Excuse me, Mr. President; I thought that I had given my personal experience and personal observation in the paper that I have presented. That is certainly what I intended, and what I believe I did. It was simply a statement of what I knew of my own knowledge, and it was so understood by me; and I supposed it was so understood by the Association. I supposed that I was giving my personal experience and observation without being an advocate of the Lowe process.

Mr. Littlehales—I would like to ask Mr. Pearson whether he measured the gases separately or mixed them.

Mr. Pearson—We measured them separately.

Mr. Littlehales—Can you give us an idea of the difference in the cost between the two gases.

Mr. Pearson—I said in my paper about 15 cents per thousand feet.

Mr. Littlehales—Do you mean after allowing the interest you would have to pay on the patent purchased and on the plant?

Mr. Pearson—I said about 15 cents per thousand feet in the cost of making the gas. I leave the cost of the plant out of the question.

Mr. Littlehales—Of course, that would make a considerable difference if you added the interest upon the cost of your plant, patent rights, etc., the result you arrived at might differ from that you have stated. What I wanted to get at is what the commercial advantage to your company is over coal gas?

Mr. Pearson—There is a very considerable saving in the matter of coal. If we had not used this process we should have had to erect more coal sheds, and have purchased additional property; and we have made a saving of interest in that respect in favor of the Lowe process.

Mr. Littlehales—I submit that that is scarcely an answer to my question. What I want to get at is—adding the amount per thousand feet of the cost of patent rights and of the cost of the plant, add the interest on that, say, at 8 per cent., or any other sum, and then taking the reduced cost, as you have stated, what is the commercial advantage to your company in making gas by the Lowe process over the coal process?

Mr. Pearson—I have answered that question in one way; but I can probably answer it as you desire in a moment if you will give me time. I can probably make up the figures so as to give you an intelligible answer. I can hardly state that now, for the reason that, not having had experience in the works which we are now erecting, I can't give the answer to Mr. Littlehales question at once, off-hand.

Mr. Littlehales—It is the most important consideration to us in the whole thing.

Mr. Pearson—I cannot now give you an intelligible answer to the question. I ask the Association to bear in mind that we only commenced the use of this process last spring, and that we are running the two processes together side by side. We are now erecting larger works; and, after a year's experience in the manufacture of gas entirely by the Lowe process, I shall be able to give you more satisfactory data next year than I can at present.

Mr. Denniston—In continuation of Mr. Littlehales' question, I would like to ask Mr. Pearson if he puts the expense of purification into his estimate.

Mr. Pearson—I do.

Mr. Denniston—In speaking of the results, you say that it has cost so much for having a certain number of men to produce the gas, but you did not state that there were four or five men employed in purifying the gas.

Mr. Pearson—Not in our works. I alluded to Baltimore. I said it cost about 3½ cents per thousand feet to purify the gas, including labor. When I speak of a saving of 14 or 15 cents in making gas under the Lowe process, I include all expenses—the cost of putting in the holder, including purification.

Mr. Littlehales—You mean the cost of materials and labor only. When you speak of the whole expense, do I understand you to refer to materials and labor, or to the cost of the plant and the cost of the patent rights?

Mr. Pearson—I said materials and labor only.

Mr. M. S. Greenough—I would like to ask Mr. Pearson if he ascertained the amount of carbonic oxide in his gas?

Mr. Pearson—Not in our gas. The Kingston gas was tested before we introduced it in our works. We did not have our gas analyzed.

Mr. A. L. Allen—I suppose the question under discussion is the subject of water gas?

The president—No, sir; the immediate subject under discussion is Mr. Pearson's experience in Toronto in the use of the Lowe process. It is not in order to speak on the general question of water gas. After we get through the discussion of this matter, other remarks upon the general subject may be in order, if the members of the Association desire to hear them.

Mr. Littlehales—I would like to ask Mr. Pearson, when he speaks of the comparative cost of the gas made by the Lowe Process, and that made exclusively from coal, how much he made from his coal under the coal pro-

cess, how much he made per retort and per man? These are important points bearing upon the comparative cost.

Mr. Pearson—I will answer one question at a time. We make about 9400 or 9600 feet per ton of coal of 2000 lbs. We make about 34,000 or 35,000 feet per bench of sixes per diem, two men being required.

Mr. Littlehales—What size retorts?

Mr. Pearson—They are nine feet long, and 21″ × 14″.

Mr. Littlehales—Do you have two men to a bench of sixes?

Mr. Pearson—Yes; one for the day and one for the night.

Mr. Littlehales—Then I understand you to say that you get from your coal, per man, about 18,000 feet per diem?

Mr. Pearson—Yes; about 18,000 feet per diem.

Mr. Littlehales—And about 9,600 feet per ton?

Mr. Pearson—Those are the outside figures. I said from 9,400 to 9,600.

Mr. Littlehales—You compare the cost of oil gas, of course, with the results at your works?

Mr. Pearson—We do.

Mr. Gerould—What kind of coal do you use?

Mr. Pearson—Youghiogheny coal, and coal that comes from Brockville and Reynoldsville; but principally Youghiogheny.

Mr. Gerould—You make from 9,400 to 9,600 feet of gas, per short ton, of 16 candle power?

Mr. Pearson—Yes.

Mr. McIlhenny—I would like to ask Mr. Pearson whether in the test that was made by the Government Inspector, he used the new London argand burner, or the old fifteen-hole Argand? What instrument was used in making the test?

Mr. Pearson—I cannot answer that question. I think it was the old burner.

Mr. McIlhenny—I thought you mentioned having tested it with the Sugg burner.

Mr. Pearson—I tested it myself frequently with Sugg's illuminating power meter, which I compared with the government photometer. The result was between 15 and 16 candles.

Mr. McIlhenny—Iwill state for the information of the Association that in the Government Inspector's office in Washington, we find that the fifteen-hole argand burner, established by law for testing gas made in Washington, makes the gas 1.65 candles less than the new burner used now, or the Sugg meter. So that gas tested by the new burner would be 1.65 candles better than when tested by the old burner.

Mr. Pearson—Both gases were tested by the same burner.

Mr. McIlhenny—If I understand Mr. Pearson correctly, the gas in Toronto would be a little over 14 candles by the test used in Washington.

Mr. M. S. Greenough—I do not wish to ask any question of Mr. Pearson which would seem to be inquiring into the private business of his company; but, as bearing upon the question of comparative cost of the two gases, and the comparative cost of materials, according to the location of different cities, I would like to ask him what is the market rate for Youghiogheny coal and the market rate of petroleum oil in his town?

Mr. Pearson—As my answer to that question would probably be published in the American Gas Light Journal, and so might reach the Toronto papers, I would prefer not answering that question publicly. I will tell Mr. Greenough privately with great pleasure.

Mr. Greenough—I did not suppose there would be any objection to the market rate of coal and petroleum being published. They are, in fact, published, I suppose, in the papers of Toronto.

Mr. Pearson—If you can get the cost of the coal and the cost of the oil, you can very soon get at the cost of the gas in the whole of it. I prefer not answering that question. I will give Mr. Greenough all the information I can upon that point privately; but I do not wish to make a statement for publication.

Mr. Littlehales—Perhaps I can give some information upon the point suggested by Mr. Greenough. We can get crude oil delivered in the neighborhood of three cents per gallon. Most of you know the cost of coal at Cleveland, or the Lake Erie ports. The freight ranges from 85 cents to $1.10 cents per ton of 2,000 lbs. As I said, crude oil comes to about three cents delivered over the rail of the vessel. We get good grades of Pittsburg coal at about $4.00.

Mr. Pearson—It costs us a little more than that for crude oil.

Mr. Coggshall—As Mr. Pearson has referred to a saving of 15 cents per 1000 feet of gas made, and has stated that he makes from 9,400 feet to 9,600 feet per ton of coal, I would state that there are works in Massachusetts, I think in Newton, that have averaged 11,600 feet per ton of coal, of 17 candle gas. The coal used is Youghiogheny, Penn, Westmoreland, or coals of that character.

A Member—I would like to ask if his meters have been tested lately?

Mr. Coggshall—I cannot say how that is. He is using two gallons of oil to a ton of coal. I have allowed six cents per gallon for oil on the long ton, and after taking off the fraction the oil is 12 cents per ton of coal. I think that was the average last month.

Mr. Gerould—I would like to ask if it is fair to compare the Lowe process of making gas with a product of 30,000 feet per bench from benches of sixes?

Mr. Pearson—I did not say 30,000 feet. I said from 35,000 to 36,000 feet. I compared it with our own make. I did not compare it with other places.

Major Dresser—As a matter of comparison with some other works, there has been a statement made here which might give the impression, in reading the proceedings, that all the companies in the United States were making gas at that rate. That cannot be fair. I think we have some others here who are able to give us some facts upon this point. Mr. Dwight, who is present, has been running six benches of sixes.

Mr. Dwight—I have averaged during the last year 42,000 feet to the bench. I have made, for a week at a time, over 50,000 feet to the bench. The retorts are nine feet long, and 14 × 26.

The Secretary—What kind of coal?

Mr. Dwight—Penn coal and Youghiogheny coal—I speak of the long ton.

Mr. Neal—What is the candle power.

Mr. Dwight—The caddle power was about 16 candles all the time—from that to 17.

Mr. Cartwright—I have heard some criticism on the Lowe process, and I would like to ask Mr. Pearson if he made photometrical observations during the progress of the charge?

Mr. Pearson—I did.

Mr. Cartwright—How did you find your gas to vary between the first of the charge and the last.

Mr. Pearson—Probably from 22 down to, say, 20, and even down to 10. There is more or less variation; but if I understand the question to be whether we can make a uniform gas as it goes in the holder, and as it goes out in the city, I say it is a uniform gas, but there is a great variation between the first gas and the gas which is made later on.

Mr. Cartwright—You find no variation after it leaves the holder?

Mr. Pearson—No; not after it leaves the holder.

Mr. Cartwright—What has been the experience of your consumers? Have they found any difference between the gas supplied by the new process and that supplied by the old?

Mr. Pearson—We had some complaints from consumers; but no more than in ordinary cases. We had one complaint from a gentleman who knew that we were making gas by the new process. We sent up to his house and found that his gas was only half turned on at the meter. Another complaint was investigated, and we found some naphtha in the pipes. In every instance where we investigated complaints we have found the cause to be defective burners, or a partial stopping of the pipes. There has been no more of this, however, than there was by the other process. In fact, we have not had so many.

Mr. Harbison—In regard to the cost of purification, if I understood you correctly, you purify, on an average, about 10,000 feet per bushel of lime. I think you said the cost of purification was three and a-half cents a thousand.

Mr. Pearson—About that.

Mr. Harbison—The cost of the lime alone would be two and a-half cents.

Mr. Pearson—With lime at 22 cents a bushel.

Mr. Harbison—I understood you to say that you had three men in the purifying house. Their wages would be, at least, $1.50 per man. I understood you to state you were making 150,000 cubic feet per day. That alone would be three cents per thousand for labor in the purifying house, which, added to the cost of the lime, would make the cost of purifying 5½ cents per thousand, instead of 3½ cents, if I figure correctly.

Mr. Pearson—These men were sometimes employed for the coal gas. I made up the figures carefully before I came here.

Mr. Sherman—What is the specific gravity of this combined gas?

Mr. Pearson—The specific gravity of the combined gas, as tested by Mr. Goodwin's apparatus, was 550 if I recollect rightly.

Mr. McCauley—Is the salary of the superintendent of the works added in to the cost of the gas per thousand feet?

Mr. Pearson—The salary of the foreman connected with that department is included; but I have not added in the salary of the superintendent. It would be, however, a mere bagatelle.

Mr. McCauley—There seems to be a wide difference among gas engineers as to what will enter into the cost of the gas when delivered into the holder.

Mr. Pearson—I could very soon tell you what the salary of our superintendent will be as an item of cost.

Mr. Sherman—I would like to know if Mr. Pearson has found any difficulty in the distribution of this gas—whether the mains had to be enlarged?

Mr. Pearson—Not on that account. We have enlarged our mains on account of the large increase in consumption.

Mr. Cartwright—Do you make a general distribution at the same relative

pressure as before the introduction of the Lowe process, or at a lower pressure? Did you make changes in the burners?

Mr. Pearson—We made no change in the burners.

Mr. Cartwright—Did you make a change in the distributing pressure?

Mr. Pearson—We kept it a little higher.

Mr. McCauley—Have you found any difference in your loss from what is commonly known as leakage?

Mr. Pearson—I will say, in regard to that, that I have been so very busy, that I have not made up my leakage account for the last two or three months, and I cannot answer that question. There is not any more.

Mr. Neal—I understand you to say you have two sets of gas works, an ordinary coal gas works and water gas works.

Mr. Pearson—Yes, sir.

Mr. Neal—You make your gas by these two processes, and send it out in the same holder, do you not; or do you have separate holders?

Mr. Pearson—We send it out through the same holder.

Mr. Neal—Then the gases are mixed about half and half?

Mr. Pearson—At present it is only about one-third. It was during this summer one-half or two-thirds coal.

Mr. Harbison—Are your holders covered in; or are they exposed to the atmosphere?

Mr. Pearson—They are exposed to the atmosphere.

Mr. Harbison—I understood you to say, in answer to Mr. Cartwright's questions, that the quality of the gas varied during the charge from 22 to 10 candles?

Mr. Pearson—About that.

Mr. Harbison—I also understood you to say the gas became mixed with the other gases in passing into the holder. I would like to inquire whether in your experience the variation of the temperature has been such as to affect it; and, if not, whether you think a very radical change of temperature on the same day would affect it. What would be the effect upon the gas in the holder if the thermometer should fall 40° within a few hours, as it sometimes does with us?

Mr. Pearson—Do you mean in regard to its contraction?

Mr. Harbison—I mean with reference to its uniform quality?

Mr. Pearson—I cannot answer that question.

Mr. Neal—Can you give us any personal experience in regard to the manufacture, distribution and sale of water gas alone?

Mr. Pearson—I cannot. I stated in my paper exactly how that was.

Mr. Neal—Then you cannot enlighten us further on that subject?

Mr. Pearson—I have given in that paper all the facts and all the points that I am able to give.

Mr. Neal—What we want to get at, I think, is what Maj. Dresser has so often called "bottom facts."

Mr. Pearson—I have stated in the paper all the facts I had in my possession. As I have stated before, we have only been making gas by the Lowe process since last spring, and have been making it in connection with coal gas. I have given, in the paper which I have read, all the facts and all the data I have been able to gather from personal experience and observation of the use of this process of making gas since it was introduced at our works. We have not been making it for a sufficient length of time, and we have not been making it in such a way, as to enable me to give the most precise and definite information. We are now enlarging our works, with a view of making gas by this process on a larger scale, and after the experience of the coming year I may be able, at the next annual meeting of the Association, to give detailed and precise answers to any questions that may be asked.

Mr. C. A. White—Do you pass your mixed gases over a heated retort to fix them?

Mr. Pearson—No, sir.

Mr. Burtis—I understood you to state that you save, on an average, about 14 or 15 cents per thousand feet. That being the case, why do you not manufacture all of your gas by the Lowe process?

Mr. Pearson—As I have stated several times times before, our works are not yet erected. We intend to use the Lowe process altogether as soon as we can do so—when the demand is not greater than we can supply, as at present.

Mr. McElroy—I would like to ask you in regard to the naphthaline to which you have referred. What kind of weather did you have at the time of the formation of this naphthaline?

Mr. Pearson—It was pretty warm weather.

Mr. McElroy—You did not have any stoppage of the coal gas at the same time?

Mr. Pearson—No, sir.

Mr. C. A. White—I cannot see how there can be any naphthaline in oil gas. I have always supposed that crude petroleum vaporized was the very best thing possible to be used to clean naphthaline out of the pipes. I cannot conceive of any situation or condition of things which would permit of the existence of naphthaline in oil gas works. That is a point that I should like very much to be instructed upon. While this is not a Beecher trial, it is something similar to it in certain respects; and I, for one, would like to get at the bottom of what seems, to me, a very great mystery. I did have some trouble with naphthaline, though I do not have so much now, in fact, very little. I am greatly surprised, however, to learn that oil gas works are troubled in this way.

The President—I must confess that I was somewhat surprised when I heard the statement of Mr. Pearson that he was troubled with naphthaline in his oil gas works.

Mr. Pearson—It is difficult, of course, in works where both kinds of gas are manufactured to eliminate one from the other very carefully. It is difficult to say which furnishes the most naphthaline.

The President—If I understand Mr. Pearson correctly, the Lowe process does furnish a good proportion of naphthaline?

Mr. Pearson—I believe so.

The President—Of course, this is a point about which the members of the Association would be very glad to be enlightened.

Mr. Pearson—I have distinctly stated, in my paper, that we had no trouble outside of the works.

The President—No trouble in the mains and pipes?

Mr. Pearson—None, outside of the works.

Mr. C. A. White—Did you examine the substance carefully to know that it was naphthaline, or was it lampblack, or an excess of carbon carried over?

Mr. Pearson—It was a very hard substance, and we concluded that it was naphthaline. It was of a brownish color. We have had similar deposits from our coal gas works, and we concluded it was naphthaline. I may, however, be wrong in my statement that it was naphthaline.

Mr. C. A. White—All the naphthaline I have ever seen is composed of whitish crystals.

Mr. Pearson—I understand that perfectly; but this was solidified.

Mr. C. A. White—All the naphthaline I have seen was anything but hard. This must certainly have been the carbon carried over.

Major Dresser—I am on Mr. Pearson's side upon this question of naphthaline in oil gas works, because I have it from the very best authority that works making gas exclusively by the decomposition of steam by incandescent carbon, and the introduction of petroleum oil or naphtha for illuminating purposes, have very serious trouble with naphthaline, so much so that they have been obliged to stop work until they could clean out the pipes. This same difficulty has been experienced by a certain company in New York, so that it has been a very serious inconvenience at times. I confess, it does seem to be a singular thing, and from the experience we had previously had of naphthaline, it seems incredible; but I have had it from the most excellent authority that the thing did actually exist, and I believe the man who told me of it knew what naphthaline was.

Mr. Cartwright—What New York works do you refer to?

Major Dresser—They were works making gas by the process I have described—the decomposition of steam by incandescent carbon and the introduction of petroleum or naphtha for illuminating purposes.

Mr. Sherman—I would like to ask Mr. Pearson if he has been threatened with opposition works in his city within the last two years?

Mr. Pearson—There were opposition works threatened there between two and three years ago, but not since.

Mr. Sherman—What process did they propose to make gas by?

Mr. Pearson—I have heard there were some coal gas men (I do not know their names) negotiating with the parties who were about erecting these works. We have had no other Lowe gas men there at all, because we were selling gas at $2 a thousand, and I do not believe they would come into a place in our part of the country where they sell gas at that price. We are now reducing it, however, to $1.75 and $1.50.

Mr. McCauley—Have you found any difficulty in running your generators? We have. Our bricks become carbonized, and will not give out the heat. Do you encounter any of that difficulty in running the generators? Do you find that the bricks do not give out the heat perfectly?

Mr. Pearson—No; we did not find any difficulty of that kind. We have found that there is a slight deposit of carbon on the bricks; we also found that the bricks ran into each other, and we were obliged to take them out and put in new ones. We only lost about 200 bricks in the two generators. I believe there were about 800 or 900 altogether.

Mr. McCauley—You found that they were vitrified and run down?

Mr. Pearson—Pretty much so.

Mr. Burtis—A member has requested me to ask Mr. Pearson whether, in making up his estimate of the cost of gas, he counts in the salaries of the superintendent and foreman in both cases, or has he counted such expense in one case and eliminated it in the other?

Mr. Pearson—We have two foremen, and I have put the expense of one in my estimate of the cost of coal gas, and the expense of the other in my estimate of the cost of the Lowe gas. As I have stated, we do not include

the salary of the superintendent in the estimate of the cost of the Lowe gas. It would, however, be a mere trifle, and would not effect the calculation.

Mr. Burtiss—Mr. Pearson has stated that he makes one-third Lowe gas and two-thirds coal gas. If there is such a saving in the Lowe process why is it that he does not make a larger proportion of Lowe gas?

Mr. Pearson—Because our consumption is so great that we send out 400,000 feet of gas. We did not begin to make the Lowe gas until the 9th of February of this year. We made a very small percentage during February, and only really commenced running the Lowe gas works in the beginning of March. We are getting all we can out of the Lowe gas works, but our consumption is over 400,000 feet, and we cannot make more than one-third by the Lowe process until we get our new buildings erected.

Mr. Diall—What is the largest amount of gas made in a day by the Lowe process?

Mr. Pearson—210,000 feet.

Mr. Diall—The average is how much?

Mr. Pearson—We made on an average about 148,000 feet.

The Secretary—I do not think Mr. Pearson understood the question that was asked by Mr. Burtis. The question, as I understood it, was this: Whether, in making up the cost of the coal gas, and also the cost of the Lowe gas, you included the salaries of the foremen in both cases alike? You make two kinds of gas, the Lowe gas and the coal gas, and you have a foreman for each; did you include the salary of the coal gas foreman in your estimate of the cost of coal gas, and did you also include the salary of the Lowe gas foreman in your estimate of the Lowe gas?

Mr. Pearson—The two foremen attend to both works, or look after both. We charge one-half of each man's labor to the Lowe gas, and one-half to the coal gas.

Mr. C. A. White—Mr. Pearson says it requires more skilled labor to run this Lowe process than it does to run the ordinary coal process. May I ask what wages you have to pay these men who run your Lowe gas process?

Mr. Pearson—We pay these men the same as we pay stokers.

Mr. A. C. White—They do not require any extra pay, then?

Mr. Pearson—I think they ought to get a little more, but we do not pay them any more.

Mr. A. C. White—What do you pay stokers?

Mr. Pearson—We pay what is considered very good wages in our part of the country—$1.75 a day.

Mr. Slater—We have been asking Mr. Pearson a great many questions, but it seems to me that he is hardly in a position to answer them satisfactorily, either to us or to himself. The questions that have been asked are those that called for very precise and detailed information, which Mr. Pearson's present experience in the use of the Lowe process does not enable him to answer in a perfectly satisfactory manner. He has stated over and over again that he is making one-third of the gas which he sends out by the Lowe process, and two-thirds by the coal gas process. He has also stated that he did not begin to use the Lowe gas process really until the beginning of March last. It seems to me, therefore, that he cannot be expected, with the experience he has had thus far, to answer every question that may be asked, or to meet every suggestion as it is made. His company propose to erect additional buildings, and continue the use of the Lowe process on a much more extended scale. If these works are put in operation during this year Mr. Pearson will have abundant opportunity to enlarge his experience and his knowledge in relation to the practical working of this process, and he will undoubtedly be able, at the next annual meeting of the Association, to furnish the members with information of the most minute and satisfactory character. As the matter now stands, however, I do not think we can reasonably or fairly expect Mr. Pearson to answer all these questions that have been propounded. He has prepared and read a most able and interesting paper, which embodies all the facts in relation to the Lowe process that he has been able to gather from his personal experience and observation during the time that process has been in operation at his works. He can, at the present time, do nothing more than reiterate the statements he has made, and it therefore seems to me that the question had better be left where it now stands until Mr. Pearson, after a more enlarged experience and more extended observation, shall be able to give us the information which it is not now in his power to furnish.

Mr. Pearson—As the Secretary has stated, I was very much opposed at first to preparing any paper on the subject, ann I only did so at his most urgent solicitation. I have given in that paper all the information I can give you at the present time. I tried to make it as intelligible as I could. I cannot tell you about the results of the process, using it as we have been using it, and for the short time it has been in operation at our works; and nobody can reasonably be expected to do so. I am quite prepared to give you all the information I possess, and I think I have already done so.

Mr. Sherman—The capital account has, in my judgment, more to do with the price of gas to our consumers than any process. I would like to ask Mr. Pearson what the capital of his company is?

Mr. Pearson—$600,000.

Mr. M. S. Greenough—I would like to ask Mr. Pearson if he included in the cost of the coal gas the cost of plant, etc.?

Mr. Pearson—Yes.

Mr. Diall—Mr. Pearson states that we will save 15 cents on the gas manufactured by the Lowe process, manufacturing at the same time two-thirds coal gas. He says, also, that the coal gas was selling for $2, and that now it is selling for $1.75; and the statement is made in such a way as to leave the impression on the minds of some of the members of the Association that the reduction was made in consequence of the introduction of the Lowe process. What I want to know is whether or not this reduction was made upon the anticipated merits of the Lowe gas?

Mr. Pearson—Partly.

Mr. Diall—Yet he does not show any results that would warrant any such reduction for that reason. Either they were charging too much for their coal gas, or the results of the Lowe process were greatly exaggerated, because he has not yet developed anything to justify the reduction.

Mr. Pearson—We expect to do a great deal better than that when we get our additional works erected. The reduction was made for good and sufficient reasons, and we have not, thus far, found any cause to believe that we made an error in judgment. The results of the Lowe process have been sufficiently satisfactory to us to warrant us, as we think, in extending our works and continuing the use of the Lowe process upon a much larger scale.

The President—I suppose you continue this system of manufacturing both kinds of gas until the material for one kind or the other advances to such an extent that you cannot afford to use it. Are you aware that the cost of oil has advanced sixty per cent. in the last two or three months?

Mr. Pearson—I am aware that it has not done so in Canada. I can purchase it as cheaply now as when we made our contract.

The President—Do you not know it to be a fact, that petroleum has advanced in value in the American market 60 per cent. within the last month or two, and is still advancing, and likely to advance?

Mr. Pearson—I am quite well aware of the fact that there are fluctuations in the market price of petroleum; but we have an understanding that we shall get our petroleum cheaper than ordinary consumers can purchase it, as we are getting it to-day, and I am pretty well convinced that, with the present understanding we have, we will probably be able to get it as cheap next Spring, when our contract expires, as we are getting it to-day.

The President—You do not suppose, do you, that if petroleum should advance to four times its present value, you would still be able to buy it at a very low price?

Mr. Pearson—I do not know how we will be able to buy it; but I have every reason to believe that we could buy it much cheaper than ordinary consumers.

Mr. Helme—There is one thing to be said about this question of the price of petroleum. As I understand it the Canadian petroleum is an inferior article compared with that which comes from this state; and until the petroleum which is produced here becomes very much higher, I doubt very much whether the price of petroleum in Canada will be very greatly affected. Is not the petroleum produced there inferior to ours?

Mr. Pearson—It is inferior.

Mr. Helme—And, therefore, until the petroleum in this market gets very much higher, the price of petroleum there will not be affected.

Mr. Pearson—I believe that to be so.

The President—Don't you think that the Canadian market would sympathize with the American market, if the price of petroleum advanced here from 60 to 100 per cent.?

Mr. Pearson—I cannot speak positively as to that.

The President—What kind of a position will you be in for making petroleum gas when the petroleum market advances to four or five times its present value?

Mr. Peaason—It will make a very considerable difference in making the gas if that time ever comes. There can be no question about that.

Mr. McIlhenny—I would like to ask Mr. Pearson if he has made any calculations as to what the result would be if all the companies in the United States made gas from oil? Because, if the process is so much superior, as Mr. Pearson evidently thinks it is, all the companies in the country will adopt it. I think Mr. Pearson has given us a very fair and impartial statement. He has given us the cost upon both sides, so that we can easily calculate it for ourselves. He has told us how much labor and material it takes to make a thousand feet of both kinds of gas; and I think we are under many obligations to him for the clear and explicit manner in which he has stated the facts. I would like to ask him whether, owing to its great superiority and cheapness, he anticipates the universal use of petroleum for making gas; and, if so, whether he has calculated what the commercial effect upon the market will be?

Mr. Pearson—I do not anticipate that it will be universally used in the United States, but I do think it will be in Canada. If it is, we have such an abundant supply that all the gas companies could use it, and such use would have very little effect upon the price.

[To be continued.]

[From the Buffalo *Commercial Advertiser*, Thursday, Nov. 13th.]

The Late O. G. Steele.

ACTION OF THE BUFFALO GAS COMPANY DIRECTORS.

At a special meeting of the Directors of the Buffalo Gas Light Company, held Thursday, Nov. 13, the following preamble and resolutions were unanimously adopted :

Whereas, The members of this Board have learned with feelings of deepest regret of the death of their late Associate and Secretary, O. G. Steele.

Resolved, That in the death of Mr. Steele we have lost a valued friend whose removal from among us has created a void which will long be felt by the surviving members of this Board.

Resolved, That the death of Mr. Steele falls with peculiar grief upon the Board, from the fact that he has filled his position with marked ability for 31 years, having been connected with the Company from its inception to the present time, conducting the business of the Company with firm adherence to right, and under the varied transactions with the public, in a spirit of fairness which commanded universal respect.

Resolved, That we tender to the family of the deceased our warmest sympathy in their bereavement, and that this Board will attend his funeral.

Resolved, That these resolutions be entered upon the records of this Company, and a copy be transmitted to the family of the deceased; also, that copies be sent to the city papers and the AMERICAN GAS LIGHT JOURNAL for publication.

ACTION OF THE GAS COMPANY EMPLOYEES.

At a meeting of the employees of the Buffalo Gas Light Company the following preamble and resolutions were unanimously adopted :

Whereas, It has pleased our Heavenly Father to remove from our midst our late worthy and esteemed Secretary, Oliver G. Steele.

Resolved, That in the death of Mr. Steele we have lost a kind adviser, true friend and benefactor.

Resolved, That we shall cherish his memory, for his rare personal qualities, and for the kindness of his nature which rendered our intercourse (to some over 25 years) with him so agreeable.

Resolved, That we tender to the bereaved family our heartfelt sympathy, and that we will in a body attend the funeral of the deceased.

Resolved, That a copy of these resolutions be sent to the city daily papers and the AMERICAN GAS LIGHT JOURNAL for publication.

—A meeting of the Executive Committee of the Old Settlers' Festival will be held this evening at the Young Men's Association Rooms, to take action upon the death of Mr. Steele, for many years the President of the Old Settlers. The meeting will be called to order at 7:30 o'clock.

—In token of respect to the memories of Mr. and Mrs. O. G. Steele, who were so long and so closely identified with the management of the Home for the Friendless, the Board of Managers are requested to attend the funeral of Mr. Steele.

—The Local Board of Trustees of the Normal School yesterday directed that appropriate action be taken in regard to the death of President Steele, and that as a mark of respect, the school be closed on the day of the funeral.

SKETCH OF HIS LIFE AND PUBLIC SERVICES.

At half-past four o'clock yesterday afternoon, that eminent citizen, and honorable gentlemen, Mr. Oliver G. Steele, died at his residence on Franklin street, in the 75th year of his age. There are few old residents of Buffalo now surviving whose death would occasion more sincere and profound regret among all classes of the community, for Mr. Steele, though not in the general sense of the term a public man, during the greater part of his career nevertheless rendered great services to the city in various important ways, and was identified with its material growth and prosperity for a period of over half a century. Before proceeding to give a sketch of his long and useful life, some preliminary facts with reference to his last days seem to be required.

As is well known by his friends, Mr. Steele's health had not been good for over a year past. The disease from which he suffered was enlargement of the heart, and it will be remembered that in February last his condition was such that for some time his death was thought to be imminent. But, contrary to expectations, he recovered sufficiently to be about, and occasionally to transact business, though his health was by no means fully restored. On Thursday he visited his office at the gas works. The next day he was taken ill, but his condition was not deemed serious, and on Monday morning he was able to sit up. Yesterday, however, early in the day, he complained of great difficulty in breathing; about three o'clock in the afternoon he was attacked with severe pains in the region of the heart, and, an hour and a-half later, he passed away quietly and peacefully.

SKETCH OF HIS LIFE :

Oliver G. Steele was born in the city of New Haven, Conn., December 16th, 1804, and was the son of Oliver and Sarah Steele. He came of good Connecticut stock, one of his ancestors having been a Colonial Secretary. He was given a fair common school education, and at the age of 15, went to New York where he served an apprenticeship to a bookbinder; he afterwards completed his education at Norwalk, Conn., and in the Spring of the year 1827 again went to New York in search of employment. Being unsuccessful he determined to come to Buffalo, which was then beginning to assume some importance on account of the recent completion of the Erie Canal. Soon after his arrival at Buffalo, he entered the service of the late R. W. Haskins as book-binder, for whom he worked about three years. In 1830 he set up for himself in the same line of business, in a small shop in the old "Ellicott Square Block." In 1831 he moved into the new Townsend Block, on the West side of Main street, below Swan, where he started "Steele's Bookstore," one of the most popular establishments in the town. The place was the resort of the most intelligent and cultivated people among our population for a period of nearly 25 years. Many of the successful plans for the improvement and development of the city's interests, were originated and discussed by the "solid men" of the town in Mr. Steele's book store, which became a sort of general headquarters and place of consultation for the fathers of the city. And in the projects of those days, the proprietor himself very frequently bore a prominent part. His efforts as the practical founder of our noble public school system, will be spoken of more in detail below.

In 1831 Mr. Steele married Miss Sarah E. Hull, granddaughter of Judge Zenas Barker Following Mr. Steele's career, briefly, we find that in 1837 he was elected Superintendent of Schools :—the office had been newly created, and he was the first, and one of the best, Superintendents the city ever had. He served for three years, and together with the late Judge Hall established the school system in its present form. In 1841, 1842, and 1847, he was a member of the Common Council from the old Fourth Ward. In 1848 Mr. Steele was one of the originators of the Buffalo Gas Company, with which he was prominently identified up to the day of his death. He served as the secretary of the company from the time of its formation, and was also a member of the board of directors, and was for several years past its General Manager. He was also one of the prime movers in the Buffalo City Water Works, and was the first secretary of that company, and afterwards its president. Among the other local institutions with which he had been at different times prominently identified, are the following :

The Buffalo Fire Department. He served his full time of ten years under the old system, and was the first foreman of Engine Company No. 6. He was always a member of the Board of Fire Commissioners, and for some years was President of the Board. He also drew the bill incorporating the Firemen's Benevolent Association of Buffalo.

The Buffalo State Normal School. Mr. Steele was one of the most active of the promoters of this institution, and worked hard for its establishment. He was the first and only President of its local Board of Trustees, continuing to hold that position till the time of his death.

The Young Men's Association. He was one of the founders of the old Buffalo Lyceum, which subsequently developed into the Association. In the prosperity of this excellent institution he always took a warm interest. He had been a member of the Real Estate Commission for several years.

Among other organizations with which he was connected, in most cases as one of the founders and managers, are the Buffalo Historical Society, (of which he was president), the Fine Arts Academy, Society of Natural Sciences, the Forest Lawn Cemetery Association (of which he was elected a trustee at the annual meeting on Monday last), and of the Erie County Savings Bank, of which he was a trustee. He was also one of the originators and most enthusiastic supporters of the Old Settlers' Festival Association, serving as its president, and always taking an active interest in the enjoyable annual celebrations held under its auspices. Mr. Steele was also one of the original members of the Unitarian Church, and was a regular attendant upon its services until his health failed. While a staunch adherent of the Unitarian faith, he was at the same time free from exclusiveness, and thoroughly tolerant in his religious views.

In all the organizations with which he was connected he wielded a powerful influence, and did all in his power for their progress and prosperity.

In 1858 Mr. Steele made an extended tour of Europe, and wrote a series of letters descriptive of his travels, which were afterwards published in book form for private circulation.

THE ELECTRIC LIGHT IN THE GERMAN ARMY AND NAVY.—The "Year Book for the German Army and Marine," states that the electric light has been employed for military and naval purposes—among others for lighting up the ground lying in front of a besieged fortress, for the illumination of ships at sea, and notably for carrying on work under water. A transparent bell with an electric lamp has been immersed to a depth of 60 meters, while a magnetic electrical machine placed at a distance of 100 meters has been able to maintain a strong, unbroken current, so that a brilliant light was maintained for a long time. The same authority states that experiments are now in course of being carried out for the purpose of testing how far the electric light can be usefully employed in marine warfare, and especially as a defense against torpedo attacks.

THE AMERICAN GAS-LIGHT JOURNAL AND CHEMICAL REPERTORY

A. M. CALLENDER & CO.,

PROPRIETORS.

Editor—G. WARREN DRESSER.

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VENTILATION, SANITARY IMPROVEMENT,
AND GENERAL SCIENCE.

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TUESDAY, DECEMBER 2, 1879.

Official Report of Examinations of Gas for three Weeks ending Nov. 29, 1879, made at the Photometrical Room of the Department of Public Works.

Corrected Illuminating Power.

Nov. 1879.	Time of Day at which Test were made.	New York Gas Light Co.	Manhattan Gas-Light Co.	Mutual Gas-Light Co.	Metropolitan Gas-Light Co.	Harlem Gas-Light Co.	Municipal Gas-Light Co.
10	Between 9.30 A.M. and 1 P.M.	16.68	17.17	20.37	16.70	16.47	
11		17.18	17.04	18.92	17.20	16.32	
12		17.18	17.26	19.44	17.46	15.47	
13		17.38	17.02	20.68	17.04	15.66	
14		17.02	17.18	20.21	16.44	15.61	
15		17.26	17.27	19.92	16.42	15.48	
	Average	17.11	17.15	19.92	16.87	15.83	
17		17.06	17.29	19.95	16.95	15.95	
18		17 24	17.40	20.05	16.67	16.06	
19		17.69	17.36	20.75	16.44	15.68	
20		17.09	17.05	19.21	16.89	16.13	
21		17.53	17.24	19.27	16.33	16.22	
22		17.42	17.32	18.92	16.55	16.13	
	Average	17.34	17.27	19.69	16.64	16.03	
24		16.90	17.46	21.64	17.28	16.34	
25		17.18	17.09	20.10	17.97	16.61	
26		16.88	17.11	19.81	16.85	16.70	
28		17.32	17.21	19.44	16.80	16.11	
29		17.08	16.97	19.65	16.34	15.79	
	Average	17.07	17.17	20.18	17.05	16.19	

Sugg-Letheby burner.

E. G. LOVE, Gas Examiner.

The Opening of Coal Mines in China.

The *Shen Pao* publishes a report on some coal mines in the neigborhood of Ching-men Chow, not far from Ichang. The report is written by a mandarin who was evidently accompanied by a foreign expert. Boring operations, says the report, were commenced late last autumn. The coal-producing country appears to cover an extent of 75 square English miles, 15 long by 5 broad. There are 10 layers of coal one above the other. The bed in Wotzukow is estimated to be 500 English acres; that at San-li-kang to be one-fourth its size. It is supposed that 1,200,000 tons of coal can be raised from Wotzukow, and 800,000 from San-li-kang, at the rate of 40,000 tons a year. The supply thus would last at least 40 years. It is highly probable that further explorations will bring to light fresh beds, as these discoveries are the result of merely the first investigations. It should be mentioned that a few small mines have been opened by the people living in the district, but they have not penetrated to the level of the best coal or largest seams.

The bed at Wotzukow is 100 feet below the surface The coal is just the same as the best American anthracite that is brought to China. Anthracite is a most useful kind of coal, being free from sulphur and without any impurities. It gives out great heat and can be used economically and successfully for smelting iron or other metals. It is also suitable for use on board steamers, particularly when mixed with soft coal. As affording much heat, with but little smoke, it commands a high price for household purposes. A small portion only of the coal throughout the world is good enough for smelting, and any foreign country possessing coal of as good quality as that at Wotzukow, would be content to carry it hundreds of miles to its smelting furnaces. Specimens of this and of all the native and foreign coal procurable in China have been analyzed together, and the new coal has shown itself superior to all for smelting purposes. The province of Hupei possesses several mines containing iron of excellent quality. If these are worked in connection with the coal mines, large profits should be obtained, and if the example be followed in other provinces, a source of wealth to the whole country will be opened up.—*Shanghai Courier.*

A New Field for Water Gas.

The increase of rabbits in New Zealand has been so great that it has been seriously proposed to introduce the weasel and the polecat to keep down their excessive numbers. An "exterminator," however, has been invented which seems to be effective. It consists of a machine for generating and forcing into the burrows carbonic oxide gas. On reaching the burrows a flexible tube, about 5 feet in length, is inserted into the hole, and the gas is forced into the aperture. The entrance to the burrow is then stopped, as well as all holes and fissures that can be found.

In a few seconds a great hubbub is heard inside, but this quickly subsides. The burrow is dug open after a short time, when the dead bodies of the rabbits are found huddled together in every corner.

The exterminator have been pronounced a perfect success.

Petroleum in the Caucasus.

The first attempt at using these naphtha springs was made in the year 1859 by a Mr. Kokoreff, who established a kerosene works near Baku, and, in 1864, 6,200 tons of petroleum were despatched to Russia. Four years later the quantity had doubled, in 1870 it had quadrupled, and in 1873 the output of petroleum was reckoned at 45,000 tons. In the same year the quantity of petroleum received from America was 50,000 tons while in 1877 it had diminished, owing to the development of the Baku wells, to nearly one-half.

At present the annual production of the Caucasus is estimated at 100,000 tons, and the trade is said to be still in its infancy. As an evidence of this an American company has established itself at Baku, and is engaged in laying down pipes on the one hand to convey the oil to Poti or Batoum, and on the other to the ports of the Caspian. A feature in their concession is that no other pipes can be laid down parallel with theirs within 50 versts, and that, while ordinary speculators are not allowed to acquire more than 30 acres of ground in one spot in the oil district, the American capitalists have been permitted to buy up no less than 600,000

Halifax Gas Light Co.—Mr. David Baxter has been appointed to the position of manager of the Halifax Gas Light Company, rendered vacant by the death of Mr. George Buist.

Correspondence

MUNICIPAL GAS LIGHT CO.,
NEW HAVEN, CT., Nov. 26, 1878.

Editor Gas Light Journal:

The officers of this company are as follows:

President, H. A. Pratt (of Chas. Pratt & Co., New York); Treasurer, O. P. Edgerton; Secretary and Business Manager, Nicholas R. Connor.

Capital, $500,000, in $100 shares; all subscribed.

Yours truly,

NICHOLAS R. CONNOR.

Gas Stocks.

Quotations by G. W. Close Jr., Broker and Dealer in Gas Stocks.
(with W B Scott & Co.,)

24 PINE STREET, NEW YORK CITY.

DECEMBER 2, 1879.

☞ All communications will receive particular attention
☞ The following quotations are based on the par value of $100 per share. ☜

	Capital.	*Par.*	*Bid.*	*Asked.*
Gas Co.'s of N. Y. City.				
Central	466,000	50	50	63
Harlem	1,800,000	50	40	45
" Bonds	170,000			103
Manhattan	4,000,000	50	145	150
Metropolitan	2,500,000	100	117	121
" Scrip	$1,000,000	..	100	103
Mutual	5,000,000	100	58	—
" Bonds, gold	900,000	1000	100	105
Municipal	1,500,000	100	140	150
" Bonds	750,000		105	110
New York	4,000,000	100	85	90
Northern	270,000	50	—	100
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	130	140
Citizens	1,200,000	20	70	75
" S. F. Bonds.	320,000	1000	100	102
Peoples	1,000,000	10	30	35
" Bonds.	325,000	...	--	95
" Scrip	300,000	...	75	80
Metropolitan	1,000,000	100	85	95
Nassau	1,000,000	25	70	75
" Ctfs.	700,000	1000	80	85
Williamsburgh	1,000,000	50	75	80
" Scrip		...	98	100
Kings Co	135,000	100	—	50
" Bonds	40,000	—	—	—
Union Co. E N. Y.		25	—	50
Richmond Co., S. I.	300,000	...	60	85
Out of Town Gas Companies.				
Bath, Maine	70,000	100		
Buffalo Mutual, N.Y	750,000	100	65	70
" Bonds	200,000	1000	95	100
Baltimore, Md.	2,000,000	100	95	98
" Ctfs., gold	1,000,000		95	10
Bayonne, N. J.		100		90
Brockport, N. Y.	25,000	100	...	80
Citizens, Newark	918,000	50	100	103
" " Bds.	124,000	—	105	10
Chicago Gas Co., Ills			132	—
Cincinnati G. & C. Co.				190

Derby of Conn.....	160,000	100	60	80
East Boston, Mass...		25	114	120
Elizabethtown, N. J.	300,000	20	—	130
Fort Wayne, Ind.....		100	...	—
Hannibal, Mo.....	100,000	100	95	100
Hartford, Conn.....	700,000	25	120	125
Hempstead, L. I.....	25,000	100	...	—
Halifax N. S.....	400,000	40	148	150
Hamilton, Ontario...	150,000	40	117½	
Jersey City	750,000	20	140	145
Jamaica, L. I.....	25,000	100	...	—
Jacksonville, Ill.....	120,000	50	100	...
Lewistown Maine...	400,000	100	70	80
Laclede St Louis Mo.	1,200,000	100	100	165
Long Branch.....		20	30	40
New Haven, Conn...		25	152	—
Peoples, Jersey City		...	40	50
" " Bds.				95
Peoples of Albany...	650,000	100	—	10
" Bonds	350,000	1000	--	-
Peoples of Baltimore		25	44	48
" Bonds....			106	---
Plainfield, N. J.....	80,000	100	—	105
Perth Amboy		25	—	95
Pittsfield, Mass.....			120	130
Rochester, N. Y.....		50	70	80
" Citizens		100	50	60
Rondout & Kingston			75	80
St. Louis Missouri..	600,000	50	300	—
Stillwater, Minn.....	50,000	50	—	26
Saugerties, N. Y	15,000	100	95	100
San Francisco Gas-Co., S. Fr'isco Cal.			95	95½
Toledo, Ohio.....			95	97
Troy, Citizens..	600,000	100	—	60
Washington, D. C...	1,500,000	20	170	185
" Scrip	500,000	20	100	110
Woonsocket, R. I....	150,000	100	80	...
Wilmington, Del....		50	174	...
Yonkers.....		50	—	70

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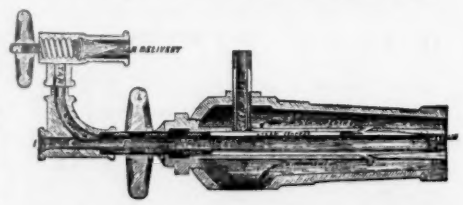

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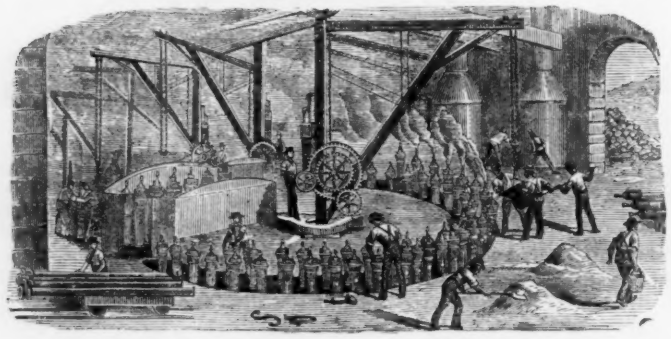

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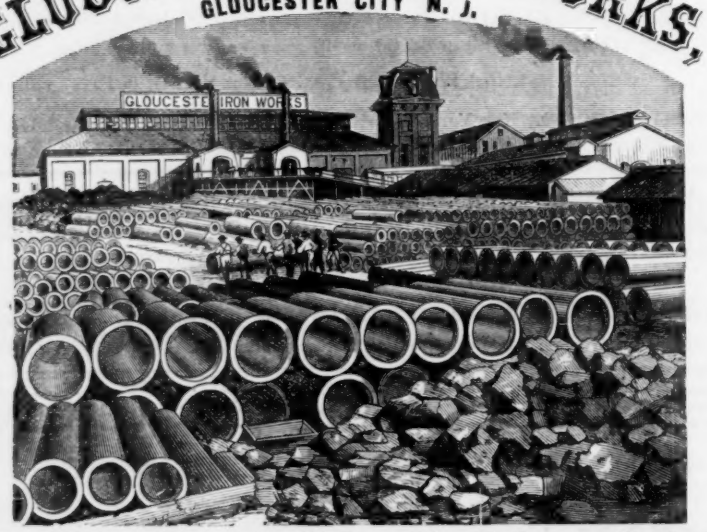

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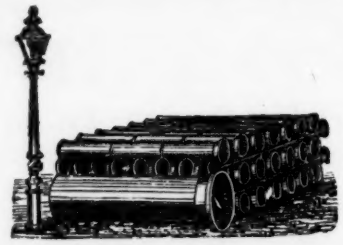

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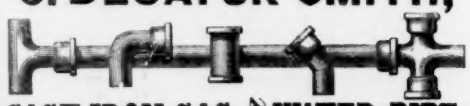

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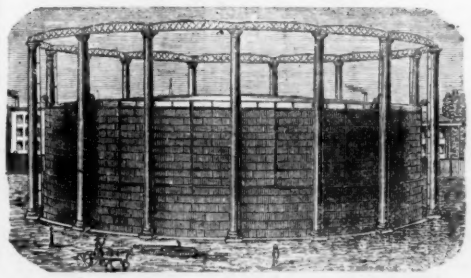

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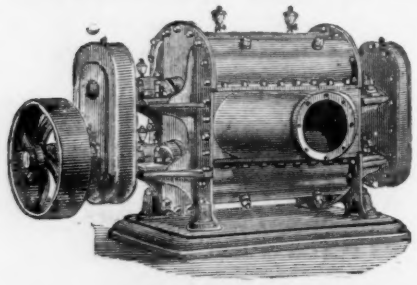

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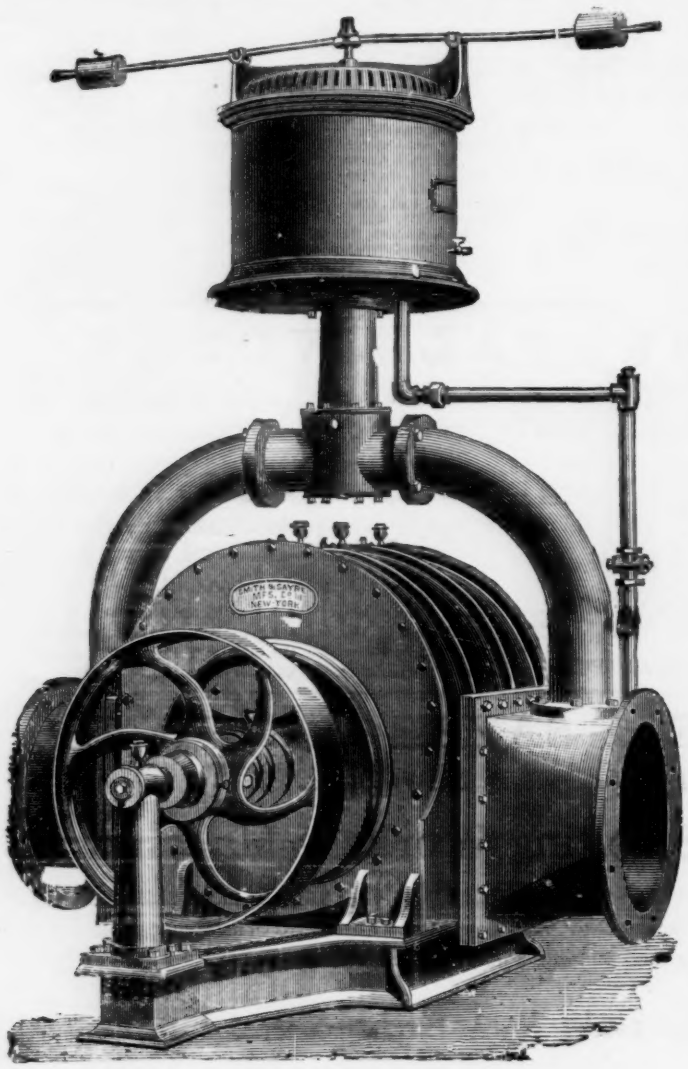

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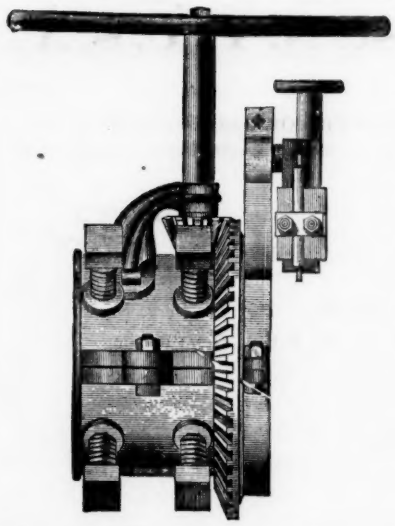

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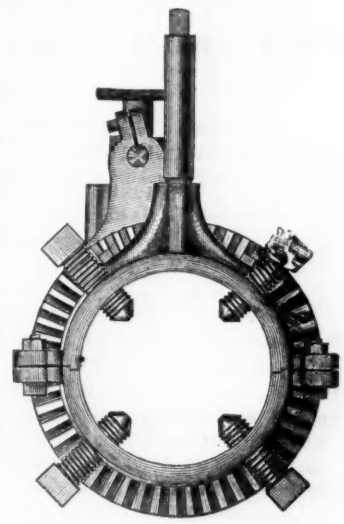

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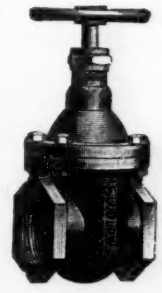

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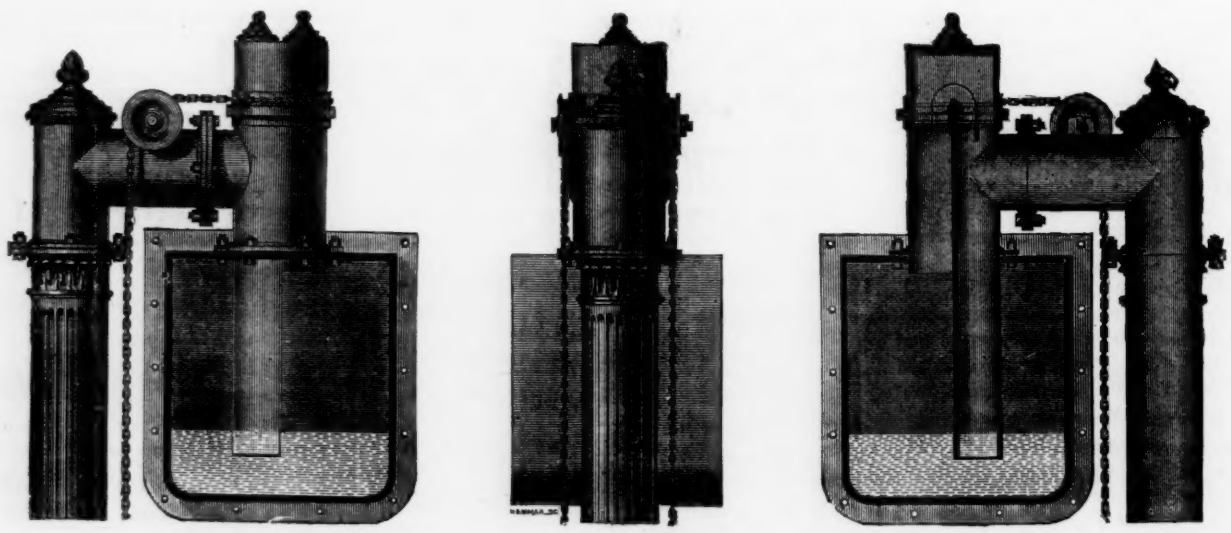

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